(No Model.)

L. W. FIFIELD.

LOOM SHUTTLE.

No. 386,531. Patented July 24, 1888.

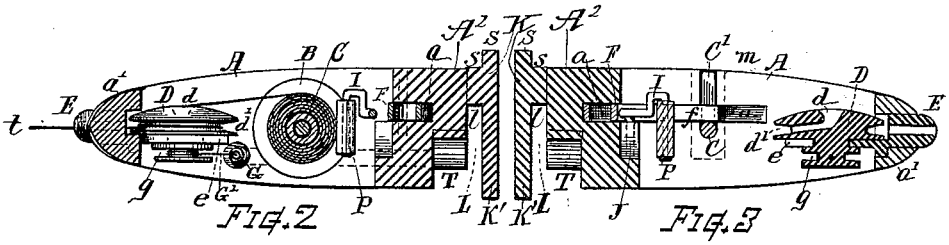

FIG. 2

FIG. 3

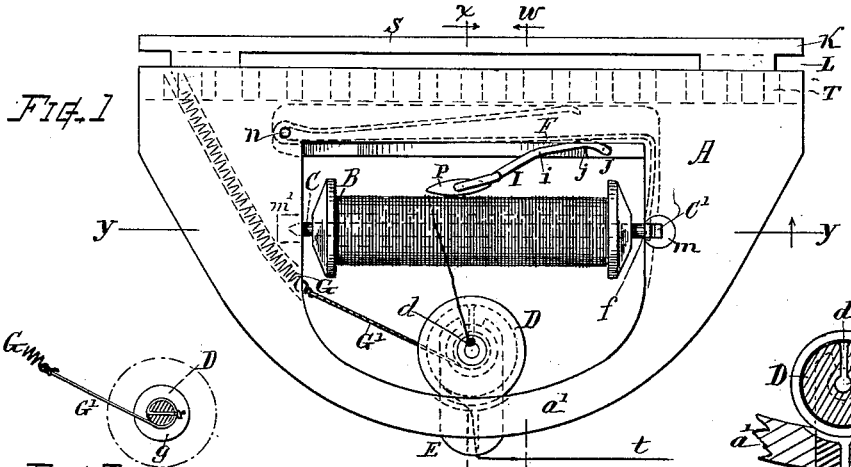

FIG. 1

FIG. 7

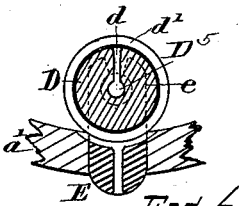

FIG. 6

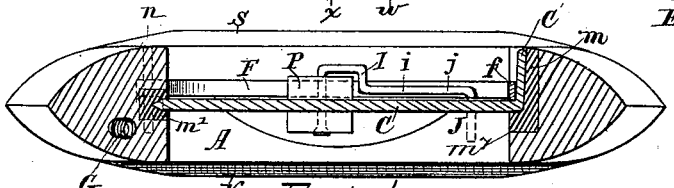

FIG. 4

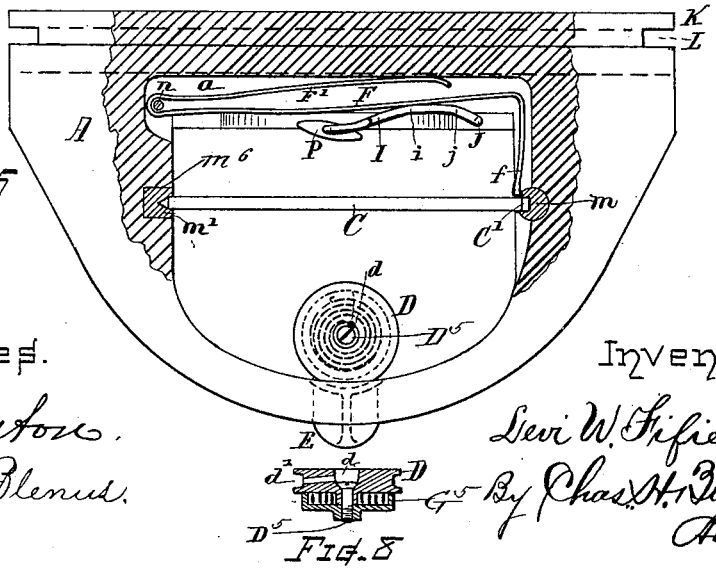

FIG. 5

FIG. 8

Witnesses.

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LOOM-SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 386,531, dated July 24, 1888.

Application filed November 25, 1887. Serial No. 256,065. (No model.)

To all whom it may concern:

Be it known that I, LEVI W. FIFIELD, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Loom-Shuttles, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

One part of my present invention consists of a rotating spring-actuated take-up or tension mechanism for controlling the delivery of the thread or yarn from the shuttle, said mechanism being arranged and organized for operation as hereinafter explained.

Another part of my invention consists in means for locking the bobbin-supporting spindle in place within the bow of the shuttle to prevent its becoming displaced while the shuttle is in use, and means for conveniently unlocking the same when it is desired to remove the bobbin.

Another feature of my invention consists in providing in the bow of the shuttle rawhide spindle-seats, inserted therein for the purpose as hereinafter explained.

Another feature of my invention consists in a shuttle for tape or ribbon looms provided with a projecting detachable back plate constructed in the peculiar manner described, to give the longitudinal groove and depending flange along the back of the shuttle, and secured to the body in rear of the rack-teeth, as illustrated and described.

Minor features of my invention will be understood from the following detailed description. The particular subject-matter claimed is hereinafter definitely specified.

In the drawings, Figure 1 is a plan view of a tape-loom shuttle exemplifying the nature of my invention. Fig. 2 is a transverse section of the same at line *w w* of Fig. 1, looking in the direction of the arrow. Fig. 3 is a transverse section at line *x x* of Fig. 1, with the bobbin removed. Fig. 4 is a longitudinal vertical section at line *y y* of Fig. 1, with the bobbin removed. Fig. 5 is a horizontal sectional view illustrating the manner of unlocking the spindle, also showing a modified arrangement of the spring for the rotating take-up device. Fig. 6 is a horizontal section of the take-up roll through the plane of the yarn-groove. Fig. 7 is a horizontal section of the take-up roll through the plane of the spring-attaching groove. Fig. 8 is a transverse vertical section of a take-up, such as is shown in Fig. 5.

In the drawings, A indicates the body or frame of the shuttle.

B indicates the thread-bobbin, supported on the spindle C in the usual manner.

D indicates the rotating take-up, consisting of a sheave or button provided with a peripheral groove about which the thread or yarn can be wound, and constructed substantially as shown in Figs. 1 to 7, and supported upon the eye-piece or thread-guide E, fixed in the front part or bow, *a'*, of the shuttle, said eye-piece being provided with a backward extension, *e*, which embraces a cylindrical portion or groove formed on the under side of the take-up button, (or to which the button can, if preferred, be attached by means of a stud,) in a manner to permit free rotation of the take-up.

A passage, *d*, for the thread enters at or adjacent to the axis of the rotating take-up and leads outward into its peripheral groove *d'*. A groove, *g*, is formed about the lower part of the take-up, to which is secured a cord, G', the end of which connects with a coiled-wire spring, G, preferably inclosed within a hole formed in the body A of the shuttle, as indicated by dotted lines. Said spring G acts by its contractive force to unwind the cord G' from the groove *g*, thus tending to wind the thread onto the peripheral groove *d'*, and thereby give a uniform, elastic, and desirable tension on the thread as it is drawn from the shuttle. When the shuttle is in operation, the draft on the thread rotates the take-up in opposition to the action of the spring, unwinding the thread from the peripheral groove to a degree that will give the required tension, and then allowing the thread to be drawn from the bobbin as the shuttle passes through the warp-shed. When the shuttle stops and starts on its return movement, the slackness of the thread is taken up by the rotation of the take-up button under the influence of the spring

with an easy, elastic, and gradual action, thereby obviating the liability of breaking the thread and insuring uniformity of tension in its delivery. A suitable manner of connecting the cord G′ is illustrated in Fig. 7.

When threading the take-up for use, the sheave or button D is first turned or rotated for straining the spring G to the desired degree and to a position that will bring the passage *d* in line with the delivery-eye E. The end of the thread is then drawn into the center of the take-up at *d* and outward through the eye E. This can be readily done by aid of a small hook inserted into the eye. Then, upon releasing the take-up, the action of the spring will rotate the button, causing the thread to be wound one or two backward turns, more or less, about the peripheral groove, according as the spring has been more or less strained. The take-up D, being supported upon the eye-piece E, as shown, occupies a position at the fore part of the shuttle, where it is very convenient for threading up, while it leaves a clear and ample space for the bobbin. The take-up thus constructed also has the advantage that it can be readily applied to the different forms of tape and ribbon shuttles commonly in use without material change in their construction otherwise by simply removing their eye or thread-guide, enlarging the opening, and then inserting and fastening the eye-piece E, which supports the rotary take-up, in place thereof. This rotating take-up automatically increases and decreases the force of the spring, and also varies the amount of surface over which the thread is drawn and the friction on the thread according to the demands of delivery. It is compact, is not liable to get out of order, and can be adjusted to any degree of tension by simply winding up the spring more or less when threading the shuttle.

In Figs. 5 and 6 I have illustrated my rotating take-up mechanism as provided with a volute spring, G^5, inclosed within the take-up or its support, instead of using a spiral spring arranged at one side and connected thereto by a cord. In this modification the action of the take-up is substantially the same as above described, the strain of the spring acting in opposition to the draft on the thread for winding up when slack and feeding off when the draft exceeds a given degree. In this instance the form of the take-up is substantially the same as that shown in Figs. 1, 2, and 3, except it is supported on a stud, D^5, that passes through the center of the disk or roll, instead of a support that embraces a portion of the take-up, as shown in Fig. 3.

I am aware that rotating take-up devices have heretofore been employed in combination with loom-shuttles, and I therefore herein make claim only to a rotating take-up constructed and arranged, as described and shown, upon the thread-guiding eye in connection with the bow of the shuttle-frame.

The second part of my invention, which relates to the locking in place of the bobbin-spindle, is as follows:

The spindle C is made of the usual form, with the upwardly-projecting offset at C′. The spring F, whereby the friction-pad P is pressed against the surface of the bobbin B, is furnished with a forwardly-extended end or bar, *f*, that reaches past the spindle-seat and extends over the spindle when in its normal position. (See Figs. 1, 3, and 4.) Said spring F is inserted in the cavity *a*, formed within the body of the shuttle A, in the manner illustrated, and the pad-lever or wire-arm I is fulcrumed or pivoted to the body, as at J, so as to swing forward and backward. Said wire I is bent or formed in such manner that it will rest against the spring at the part *j*, for pressing the pad P against the surface of the bobbin, and is fitted with a bend or protuberance at *i*, which will engage and force back the spring F when the pad P is pressed back against the body, or to the limit of its backward movement, thereby retracting the end *f*, as indicated in Fig. 5, sufficiently to release the spindle C, so that its end can be lifted from its seating-groove and its point detached from the recess at the opposite side of the opening. The spring F is confined in position within the cavity *a* by a pin, *n*, which passes through its loop. Said spring is preferably made in the form indicated, with a return-leg, F′, that rests against the frame at the back of the cavity.

The seats *m* and *m′*, for supporting the respective ends of the spindle C, I form of rawhide, as indicated. I first bore holes in the wood of the body A, the one m^6 in the direction of the length of the shuttle, and the other, m^7, extending vertically from the upper surface of the shuttle frame or body. Cylindrical pieces of rawhide are then solidly and firmly fitted into said holes, and the recesses in the seat *m′* for the point and the groove in the seat *m* for the head of the spindle, respectively, are then cut or formed in said rawhide filling, as indicated. The rawhide protects the wood, and, being slightly elastic, supports the spindle in better manner, and the seats sustain the wear for a longer time than where the spindle-seats are formed directly in a wood body. This construction also permits the convenient renewal of the seats by taking out and replacing the rawhide pieces when worn, cut, or damaged, without requiring the entire renewal of the shuttle-body.

Upon the back of the shuttle I arrange a back plate, K, which is constructed in the peculiar manner indicated, with a right-angular rabbet on its front side, leaving a narrow portion that rests against the upper part of the shuttle-back of greater thickness than the other part of said plate, and with offsetting shoulders *l s* equal, or nearly so, to the thickness of the thinner portion of the plate, so that when the plate is attached to the back of the shuttle it presents a deep groove, L, extending up between the back plate and the back A^2

of the shuttle-body in rear of the gear-teeth T, and a broad depending flange, K′, extending longitudinally of the shuttle-body, and disposed in vertical position parallel with the toothed rack T, which latter is fitted to and secured in a right-angular rabbet formed along the lower edge of the back A^2 of the shuttle body or frame. A narrow upwardly-projecting longitudinal flange, S, is preferably formed along the top of the back plate opposite the flange K′, as indicated. The purpose of the flange K′ and groove L is to retain and guide the shuttle when in use, the shoulder *l* serving as a supporting and wearing surface. The back plate, K, is best made of greater width than the thickness of the shuttle-body back A^2, so that it will project above and below the body, as shown in Figs. 2, 3, and 4. This projecting portion serves as a guard, when the shuttle is passing through the warp-shed, to prevent the threads striking the angle at the ends of the body-opening and catching on any roughness or irregularities adjacent to the spindle-receiving recesses.

The back plate, K, is an auxiliary or separate piece from the back A^2 of the shuttle, and is detachably secured thereto by screws passed through the thick portion of the plate or by other suitable fastening. The plate K is preferably made of the material known as "vulcanized fiber," thus producing a very durable and desirable construction.

The rack T is substantially of the ordinary kind employed in this class of shuttles, said rack being made as a strip of toothed rack, which is secured in a right-angular rabbet formed along the lower rear part of the body-back A^2, and secured in place therein before the back plate, K, is attached to the upper rear part of the body, as illustrated.

This construction of the shuttle, with the auxiliary back plate, K, fixed to the shuttle in rear of the gear-teeth T, and having the shoulder at *l* above the central plane, is a feature of importance, as it affords economy of construction, renders the shuttles more durable, and facilitates repairs, as ready access to the rack or gear-teeth can be had by removing the back plate when it becomes necessary to renew the rack T, which is frequently required. The rack T, being fitted in a right-angular rabbet instead of a rectangular groove, can be secured to the body A^2 by screws set in horizontally, so as to be conveniently removable, while, the wearing-surface being the shoulder *l*, the gear-teeth are not worn out of shape by contact with the guide-blocks.

I am aware that shuttles have been heretofore made wherein the back could be detached from the bow; but such construction is not of the same nature as the auxiliary back plate herein shown and described.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. The eye-piece E, having the inward projection *e*, and the rotating take-up D, mounted thereon, as described, in combination with the shuttle-frame having the bow portion *a′* and the spring G and spring-connection G′, arranged as shown, for the purpose set forth.

2. The combination, with the shuttle-frame and spindle, of a spring provided with a movable end or bar that engages the end of the spindle and locks it in position within the shuttle-frame, for the purpose set forth.

3. The combination of the shuttle-frame A, the spindle C, the spring F, provided with an extension or locking-arm, *f*, that normally extends over the spindle-seat *m*, and the friction-pad arm I, pivoted to said frame and adapted for forcing back said spring and retracting said locking-arm when the pad is pressed backward to the limit of action, substantially as and for the purpose set forth.

4. The shuttle-frame having the cylindrical rawhide spindle-bearing seats *m m′*, fitted firmly into correspondingly-shaped recesses bored in the sides of the bow portion of the frame, and having portions of the rawhide excavated to form the seating-recesses, as shown, in combination with the removable spindle having a point at one end and an offsetting head at its opposite end, all as shown and described.

5. The shuttle having the shuttle-frame A, provided with the rack at the rear side thereof, as shown, and the auxiliary back plate, K, with the shoulder *l* and depending flange K′, said back plate being attached to the upper rear part of the frame and presenting the deep upward groove L in rear of the rack-teeth, as shown and described.

6. The combination, with the shuttle-body A, having its back A^2 provided with a right-angular rabbet containing the toothed gear-rack T, of the detachable back plate, K, having the flanges S and K′ and shoulders *l* and *s*, as shown, said back plate being detachably secured to the upper part of the shuttle-back in rear of the gear-rack, with the shoulder *l* above the median plane of the shuttle-body.

7. A loom-shuttle having a wood body furnished on its rear part with the toothed rack, as shown, and provided with an auxiliary back plate of vulcanized fiber made wider than the thickness of the body, rabbeted on its front side to form a bearing-shoulder, and rigidly and detachably connected to the back of said body, with its top and bottom edges projecting above and below the same, in the manner shown and described.

Witness my hand this 21st day of November, A. D. 1887.

LEVI W. FIFIELD.

Witnesses:
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ELLA P. BLENUS.