Dec. 19, 1939. R. G. TURNER 2,184,026

SPINDLE MOUNTING FOR LOOM SHUTTLES

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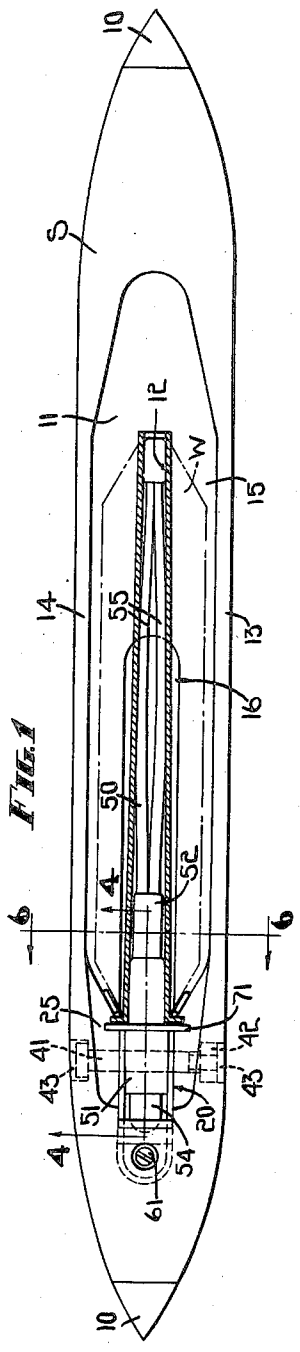

FIG. 1

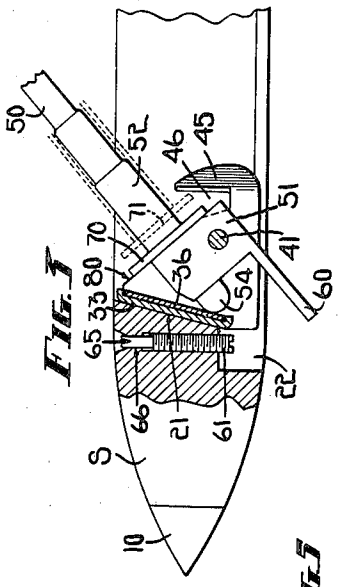

FIG. 3

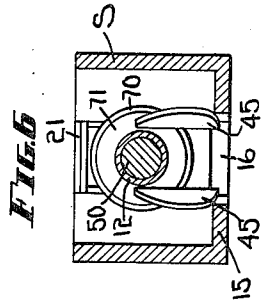

FIG. 6

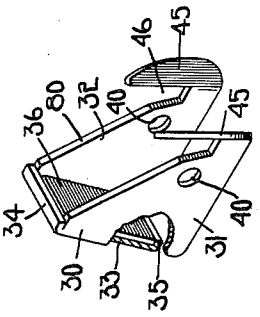

FIG. 5

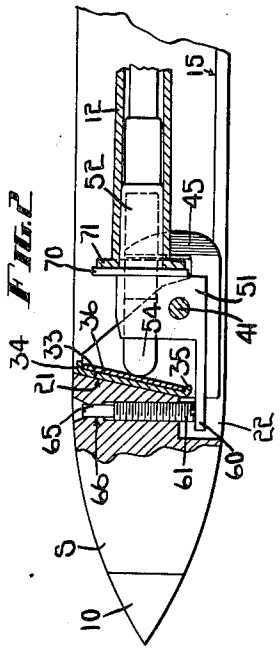

FIG. 2

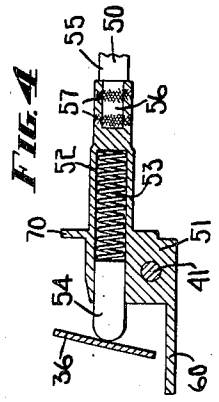

FIG. 4

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SPINDLE MOUNTING FOR LOOM SHUTTLES

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3 Claims. (Cl. 139—208)

This invention relates to improvements in loom shuttles and it is the general object of the invention to provide a mounting and control for the spindle such that the overall length of the shuttle can be reduced without sacrificing the capacity of the yarn carrying compartment.

In spindle shuttles it has been customary heretofore to employ a form of spring for positioning the shuttle which extends into the end of the body of the shuttle with the result that the latter is comparatively long. With present tendencies to increase the speed of looms it is desirable that the moving parts be as light as possible, but the previous construction of such shuttles has required them to be of considerable length and weight. It is an important object of my present invention to provide the spindle with a cavity to receive a yieldable positioning member, such as a spring plunger, which bears against a flat surface on the shuttle to position the spindle. By this construction the end of the shuttle projecting beyond the pivot of the spindle can be made shorter than heretofore. A feature permitting the shortening of the shuttle is the fact that the yieldable member extends within the spindle to a point between the ends of the weft carrying quill and beyond the spindle pivot.

It is another object of my present invention to provide the shuttle with an inclined surface so disposed that the point of contact which it has with a spindle carried spring plunger shall be located on one side of a line normal to the surface and passing through the spindle pivot in one position of the spindle and on the other side of said normal line when the spindle is in the other position. By this arrangement the spindle will be held either raised to receive a quill or in its normally down running position.

It is another object of my invention to provide a bracket for holding the inclined plate and securing the bracket to the shuttle by a single screw which also serves as pivot for the spindle.

It is another object of my invention to provide the bracket with fingers extending above the spindle pivot to engage the quill head and draw the quill onto the spindle as the latter is pushed down to normal running position.

It is another object of my invention to provide a stop screw for the spindle capable of limited adjustment and so made that it cannot ordinarily be lost or become dislodged from the shuttle.

A further object of my invention is to provide a wear plate for the spindle carried spring plunger held in place by the latter, the wear plate and plunger being removable for purposes of adjustment or renewal.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter set forth.

In the accompanying drawing, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a top plan view of a shuttle made according to my present invention,

Fig. 2 is a front elevation of the spindle end of the shuttle, parts being in section and the spindle being in down or normal running position,

Fig. 3 is a view similar to Fig. 2 but with the spindle raised to receive a quill,

Fig. 4 is a detailed vertical section on line 4—4 of Fig. 1,

Fig. 5 is a perspective view of the bracket which holds the wear plate, and

Fig. 6 is a vertical cross section on line 6—6 of Fig. 1.

Referring to the drawing, the shuttle S has the usual metallic points 10 at the ends thereof and has a weft compartment 11 in which is located a weft carrying quill 12 carrying a mass of weft W indicated in dot and dash lines in Fig. 1. The right end of the shuttle as viewed in Fig. 1 will have some form of shuttle eye which is omitted from the drawing in the present instance. The shuttle is made of wood and has front and back vertical walls 13 and 14, respectively, and a floor 15 which is slotted as at 16 to afford access from below to the quill and spindle to be described. Except for the length of the shuttle the parts thereof already described may be the same as those heretofore used.

In carrying my present invention into effect I provide the shuttle with a comparatively narrow vertical slot 20 the outer end of which is inclined downwardly and toward the adjacent end of the shuttle as at 21, see Fig. 2. The lower part of the slot is extended as at 22 to form a pocket for a purpose to be described. The slot 20 is a continuation of the weft carrying compartment 11 but is narrower than the latter. The upper part of the compartment 11, however, extends part way along the upper part of slot 20, as indicated at 25, Fig. 1.

In carrying my present invention into effect I provide a bracket 30, shown in Fig. 5, having side wings 31 and 32 which are parallel and vertical and lie along opposite walls of the slot 20. These wings are connected by a bridge 33 formed as an

integral part of the bracket and the bridge has the upper and lower edges thereof bent as at 34 and 35, respectively, to retain a wear resisting removable plate 36. The latter is restrained against motion laterally of the shuttle by the wings 31 and 32 and against vertical motion by the bends 34 and 35.

The wings taper downwardly as shown in Fig. 5 and are perforated as at 40 to receive a holding screw 41 which passes through the vertical walls of the shuttle lying on opposite sides of the slot 20. A nut 42 holds the screw in position and the front and back walls of the shuttle may have their outer surfaces recessed as at 43 to keep all parts of the screw and its holding nut within the outline of the shuttle. Extending beyond the perforations 40 toward the center of the shuttle are upwardly projecting inclined fingers 45 each separated from the wing with which it is integral by a space 46. The tops of the fingers extend above the pivot screw 41 and cooperate with the quill in a manner to be described.

The spindle 50 comprises a head 51 pivoted on screw 41 and from which projects a hollow barrel 52 in which is located a compression spring 53 the outer end of which engages a spring plunger 54 located in the hollow barrel. The split tongue 55 of the spindle may have a reduced shank 56 fitted into the barrel 52 and held therein, as by welding indicated at 57. The spring 53 normally presses the plunger 54 against the wear plate 36, thus holding the latter against the bridge 33.

An arm 60 extends outwardly from the lower part of the head 51 and enters the pocket 22 to engage a stop screw 61 which is threaded into the wooden body of the shuttle to limit upward motion of the arm 60 under the action of the spring plunger. As shown in Figs. 2 and 3 the lower part of the screw 61 is comparatively large while the upper end is reduced as at 65 to pass through a correspondingly reduced bore 66 in the shuttle. This construction prevents accidental movement of the screw 61 upwardly too high, while the arm 60 prevents the screw 61 from passing down too low. The head 50 has a collet 70 preferably integral therewith to engage the head 71 of the quill 12.

The bridge 33 which engages the wall 21 at the end of the slot 20 extends along said wall so that it lies on both sides of a line normal to said wall and passing through the axis of the screw 41. By this arrangement the single screw 41 suffices to hold the bracket securely in the shuttle.

With the spindle in the position shown in Fig. 3 raised to receive a quill the spring urges the plunger against the lower part of the inclined plate 36 and the relation of these parts is such that the contact between the plunger and the plate 36 is below a line normal to the plate 36 and passing through the axis of screw 41. There is, therefore, a force exerted by the spring tending to turn the spindle in a counter-clockwise direction around the screw 41 when in the position shown in Fig. 3, this tendency being arrested by engagement of a collet 70 against the upper edges 80 of the wings 31 and 32. The position of the spindle shown in Fig. 3 is, therefore, stable and can be maintained to permit the operator to fit the quill over the tongue of the spindle and on to the barrel 52. During this operation the head 71 of the quill passes above the fingers 45 to some such position as that indicated in dotted lines at 71, Fig. 3.

After the quill has been placed on the raised spindle the latter is pushed down, the adjacent edges of the fingers 45 engaging the head of the quill to set the same firmly against the collet 70 due to the fact that the lower part of each finger is nearer screw 41 than the upper part. Furthermore, that part of the fingers 45 which engages the head of the quill is located above the screw 41 and downward motion of the spindle will therefore move the quill longitudinally along the tongue and barrel to seat the quill on the spindle, as indicated in Fig. 2.

During descent of the quill from the position of Fig. 3 to that of Fig. 2, the plunger 54 slides upwardly along the plate 36 and passes to a position above the aforesaid line which is normal to plate 36, thereby enabling the spring 53 to exert a force on the spindle tending to move the same in a clockwise direction around screw 41 as viewed in Fig. 2 to lift the arm 60 against the stop screw 61. It will therefore be seen that the spindle is in a stable position when down and substantially parallel to the longitudinal axis of the shuttle. Any movement of the spring during the raising and lowering of the spindle takes place within a part of the spindle and as will be apparent from Fig. 4 the whole of the spring is located within the spindle barrel and no part of it is received by the shuttle. It is for this reason that the end of the shuttle extending beyond the pivot 41 or to the left, as viewed in Fig. 2, can be made much shorter than heretofore.

As will be apparent from Figs. 2 and 3 the retaining bent edges 34 and 35 of the bracket project a short distance only beyond the wear plate 36. The plunger 54 is movable into the bore of the spindle against the action of spring 53 from the extended position of Fig. 2 to the retracted position of Fig. 3. The retraction of the plunger is useful when I desire to replace the wear plate 36. Under these conditions the plunger is pushed into the bore from the position of Fig. 2 to that of Fig. 3 in a direction away from the wear plate. The latter can then be removed by sliding its upper edge to the right of and beyond the upper bent edge 34, after which it can be removed and a new plate inserted. This exchange can be effected while the bracket is in place in the shuttle.

From the foregoing it will be seen that I have been able to effect a substantial shortening of the shuttle by placing the spindle positioning spring within the spindle itself. It will also be seen that the point of contact between the plunger 54 and the plate 36 passes first to one side and then to the other of a line normal to the plate 36 and passing through the axis of screw 41, thereby making it possible to maintain the spindle in stable raised and normally down positions. It will also be seen that a single screw 41 suffices to hold the bracket 30 and the spindle in position. Further, it will be seen that the quill head 71 is moved toward the collet 70 as the spindle is depressed from the raised position of Fig. 3 by engagement with the fingers 45. Again, the screw 61 is of such form that it cannot be accidentally displaced upwardly from the shuttle and is held against downward displacement by the arm 60. Removal of screw pivot 41 permits the operator to replace or adjust the plate 36, plunger 54, or spring 53. The pivot 41 need not be removed, however, since the plunger can be retracted to permit removal of plate 36 while the bracket is still in the shuttle.

Also, it will be seen that the spindle bore and spring extend to a point between the ends of the weft carrying quill, and also preferably the spindle pivot is located at a point along the length of the spindle which is intermediate the ends of the bore.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a loom shuttle, a weft carrying spindle, resilient means located within and movable longitudinally of the spindle and tending normally to move in a direction away from the weft on the spindle, a wear plate having a flat plane surface to engage the resilient means and cooperate with the latter to move the spindle relatively to the shuttle, a bracket carried by the shuttle and positioning the wear plate, a wall formed on the shuttle along which a part of the bracket lies, and a pivotal connection for the spindle passing through the bracket and so located that a line passing through the axis of said pivotal connection and perpendicular to the plane surface lies between the limits of that portion of the wall along which the bracket lies, said wall and pivotal connection holding the bracket in fixed position with respect to the shuttle and said bracket and yielding means holding the wear plate in fixed position relatively to the shuttle.

2. In a loom shuttle, a weft carrying spindle pivotally mounted on the shuttle, a stop arm moving with the spindle, and a stop screw to engage the arm to limit angular motion of the spindle relatively to the shuttle, said stop screw having a threaded part of comparatively large diameter threaded into the shuttle and having another part of smaller diameter located on that end of the screw opposite the end engaged by the arm, engagement of the shuttle with that part of the screw between the large and small parts limiting motion of the screw relatively to the shuttle in a direction away from said arm.

3. In a loom shuttle, a spindle pivotally mounted on the shuttle, a spring plunger located in and movable longitudinally of the spindle, a wear plate to be engaged by the plunger, and retaining means carried by the shuttle and extending longitudinally of the shuttle toward the spindle a short distance to prevent said wear plate from moving vertically relatively to the shuttle, pressure of the plunger against the wear plate preventing motion of the latter longitudinally of the shuttle in a direction toward the spindle, the plunger movable into the spindle away from said plate by a distance greater than said short distance, whereby said wear plate is removable from the shuttle.

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