No. 668,123. Patented Feb. 12, 1901.

J. T. AHRENS.

LOOM SHUTTLE.

(Application filed Jan. 4, 1900. Renewed Jan. 15, 1901.)

(No Model.)

Fig. 1.

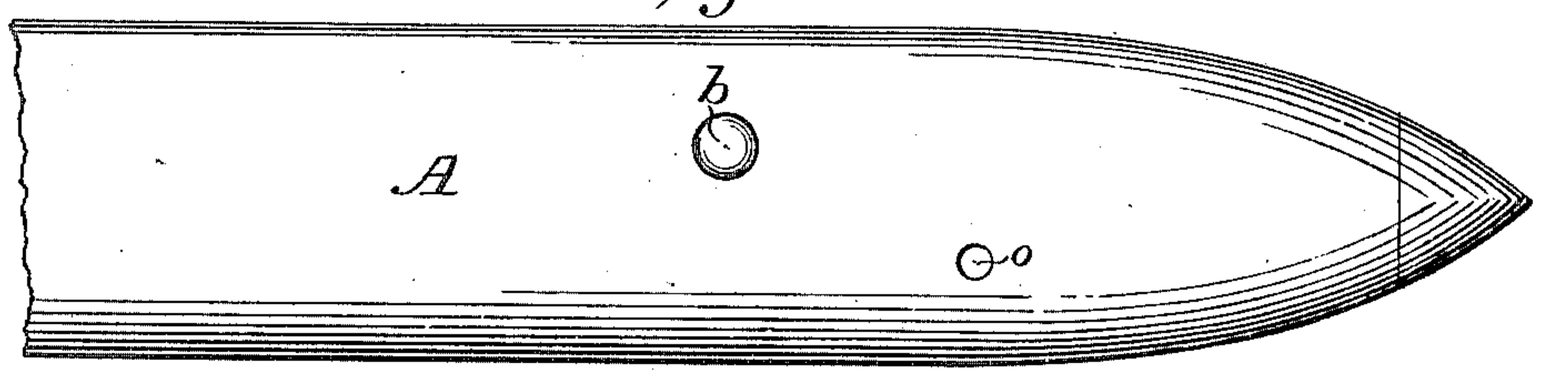


Fig. 2.

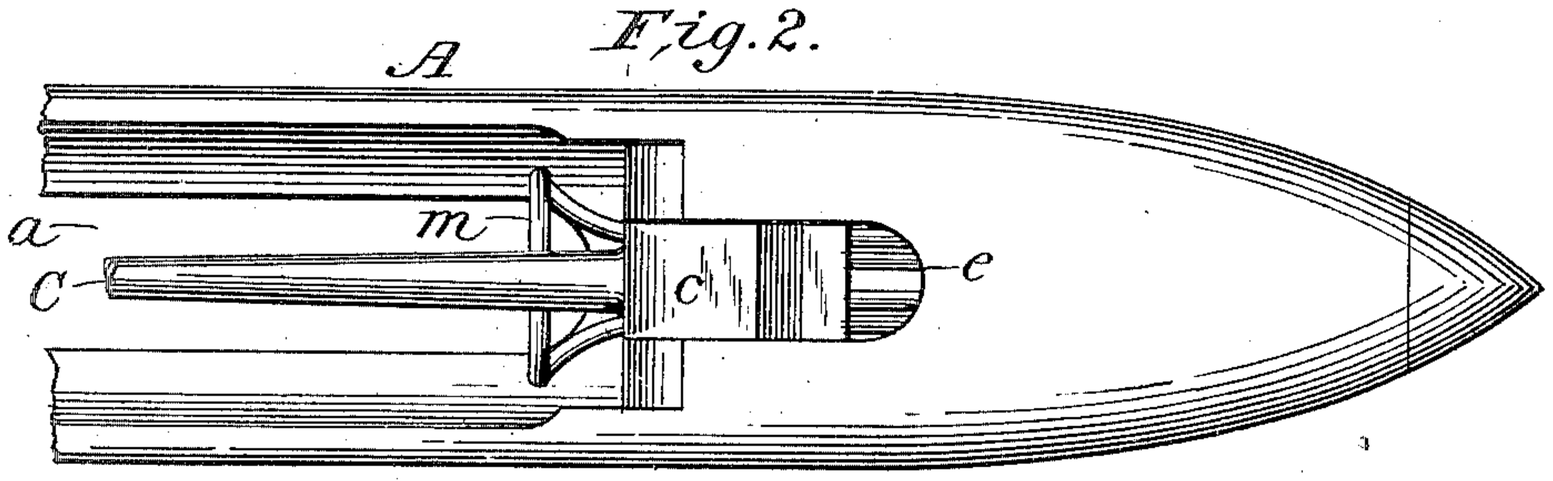


Fig. 3.

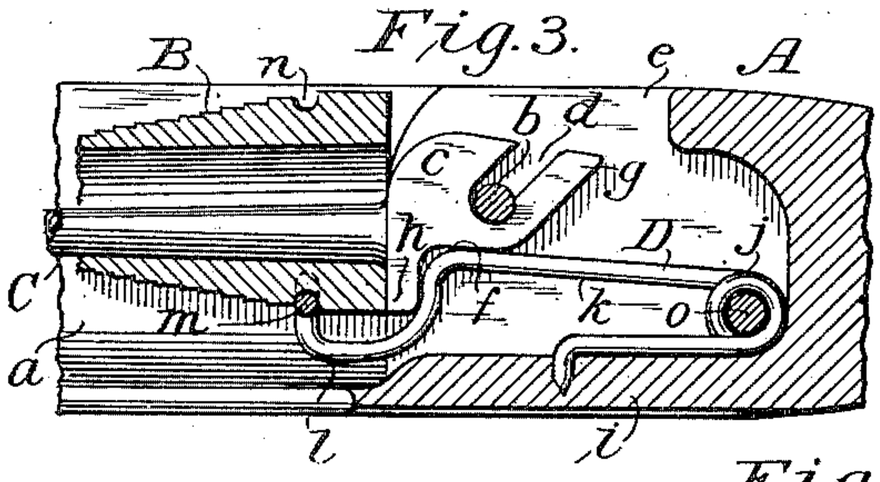


Fig. 4.

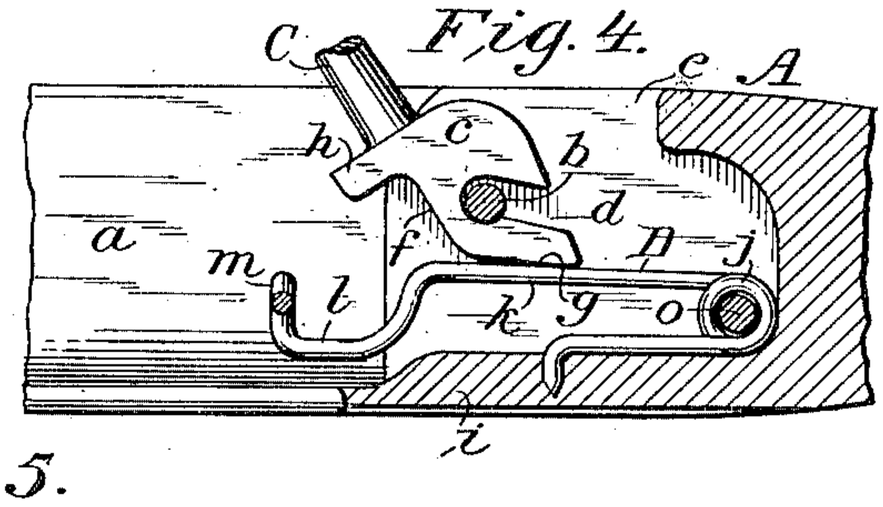


Fig. 5.

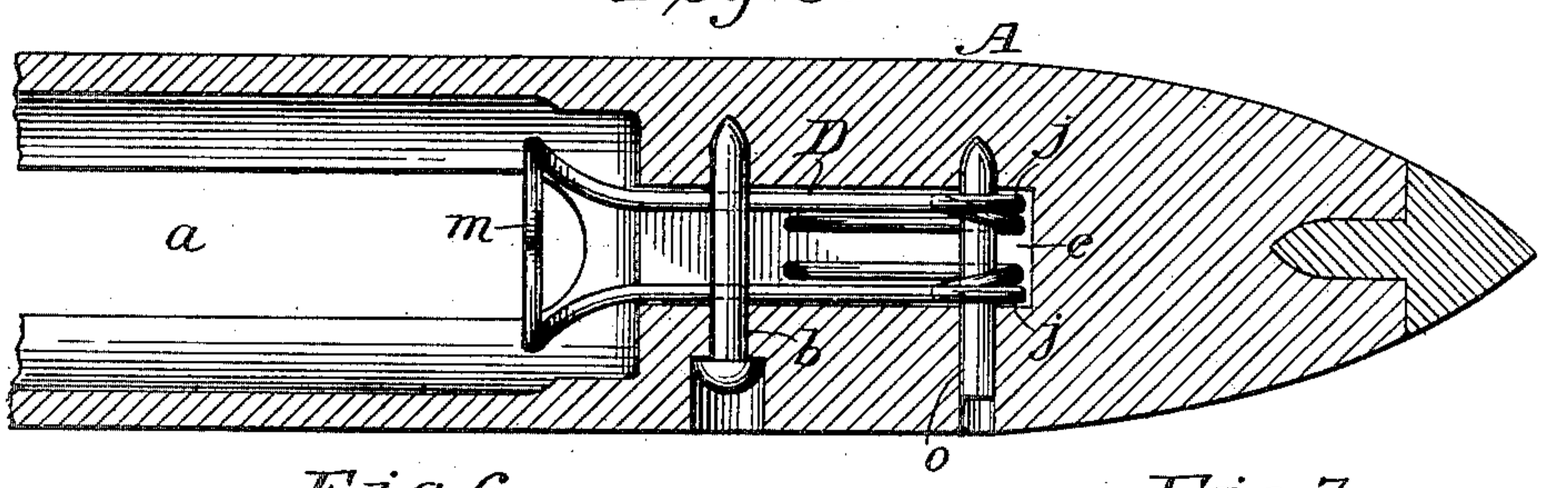


Fig. 6.

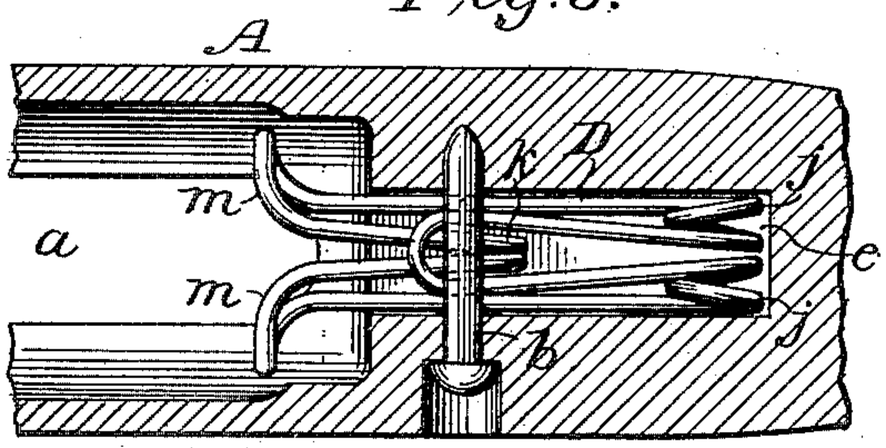
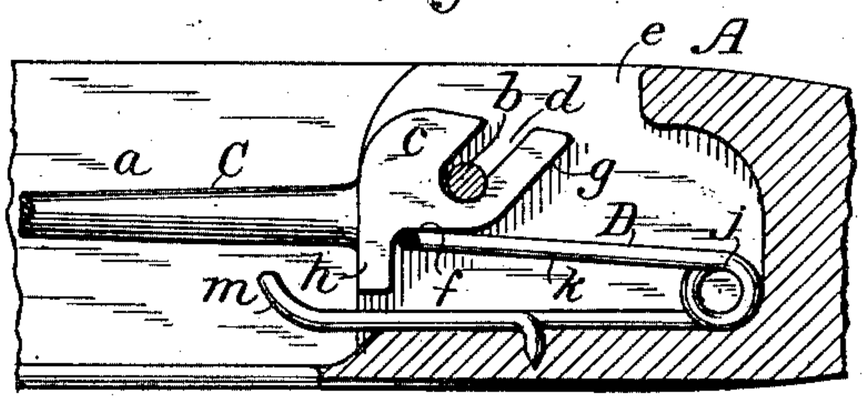


Fig. 7.



Witnesses
Jos. S. Latimer
H. G. Tracker

Inventor
John T. Ahrens
by Wilkinson & Browne
his Attorney

UNITED STATES PATENT OFFICE.

JOHN T. AHRENS, OF WILMINGTON, DELAWARE, ASSIGNOR OF ONE-HALF TO WILLIAM F. SMALLEY AND ELWOOD T. KNIGHT, OF SAME PLACE.

LOOM-SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 668,123, dated February 12, 1901.

Application filed January 4, 1900. Renewed January 15, 1901. Serial No. 43,331. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. AHRENS, of Wilmington, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Loom-Shuttles, of which the following is a specification.

The present invention consists in improved means for maintaining the bobbin-spindle of a loom-shuttle in place during the ordinary use of the shuttle and for maintaining the spindle in its open position during the removal and replacing of a bobbin or cop.

The present improvements are illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of the spindle-pivot end of a loom-shuttle. Fig. 2 is a top view of the same. Figs. 3 and 4 are central vertical longitudinal sections illustrating the spindle in two positions, Fig. 3 also showing a bobbin in place. Fig. 5 is a horizontal section. Fig. 6 is a horizontal section, and Fig. 7 a vertical section, illustrating a modified form of the spindle-holding spring. Figs. 3 to 7, inclusive, are drawn to a scale twice as large as that to which Figs. 1 and 2 are drawn.

Referring first to the construction shown in Figs. 1 to 5, inclusive, A is the body of the shuttle, having the usual central channel *a*, in which is located the bobbin B. The bobbin is slipped onto a spindle C, which is pivoted at one end on a shaft *b*, extending crosswise of the shuttle.

For the sake of clearness in description the end of the shuttle to which the spindle is pivoted will be considered the "rear" end, and the face of the shuttle shown in Fig. 2, and which is at the top in Figs. 3, 4, and 7, will be considered the "upper" face of the shuttle. In referring to the other portions of the shuttle, such as the bobbin-spindle and bobbin-spring, the same phraseology will be used as a matter of convenience. It is to be understood, however, that such words express relative position only and do not restrict the use of the shuttle in a particular position.

The spindle C at its rear end has a head *c*, which coöperates with the shaft *b* and with the spindle-spring D. This spindle-head has a slot *d*, which embraces and slips over the shaft *b*. This spindle-slot is open on the top of the spindle-head, and when the spindle is in its closed and operating position, as shown in Fig. 3, this slot extends upwardly and rearwardly. The spindle-head is placed in position by slipping it beneath and behind the shaft *b*, and the bottom of the spindle-slot *d* bears against the inner side of the shaft *b* when the spindle is in its operating position. The circular bottom of the spindle-slot *d*, which embraces the cylindrical shaft *b*, it will be noted, extends through somewhat more than half a circle, so that when the spindle occupies its uplifted or opened position (shown in Fig. 4) a downward movement upon the spindle-head is necessary in order to release the spindle from the shaft. This insures the proper coöperation of the spindle and shaft when the shuttle is in use and aids in preventing the accidental displacement of the spindle from the shaft. The shuttle-body has a shuttle-slot *e*, open at the top, closed at the bottom, and opening at the front into the bobbin-channel *a*, which is for the reception of the spindle-head and which is just wide enough to receive it, as shown in Fig. 2. This prevents any objectionable sidewise movement of the spindle.

The spindle-head has at its bottom and rear two flat retaining-faces *f* and *g*, arranged at an angle to each other and connected by an easy curve, against which the spindle-spring D bears in alternation. The face *f* is the face against which the spindle-spring bears to hold the spindle in its operating position, (shown in Fig. 3,) while the spring bears against the other face *g* to maintain the spindle open, as shown in Fig. 4. Each retaining-face when operating is below and behind the shaft *b*. The spindle-head has a depending tongue *h*, against which the rear end of the bobbin seats, and which also, by coming into contact with the spring D, limits the downward movement of the spindle.

The spindle-spring D is located and concealed within the shuttle-slot *e* and is composed of a single piece of wire bent into proper shape, both to coöperate with the spindle-faces *f* and *g* and to furnish the means for preventing the endwise slipping of the bobbin upon the spindle, and is also coiled so as to enable it to perform its office as a

spring. As shown in Figs. 3, 4, and 5, the two ends of the wire constituting the spring are embedded in the material (usually wood) of the shuttle-body constituting the bottom *i* of the slot *e*. From each of these ends the wire extends rearwardly and is bent to constitute spring-coils *j*, located at the rear of the shuttle-slot *e*, and thence proceeds forwardly in two parallel lines above the bottom of the slot *e* beneath and behind the spindle-head, these two parallel strands constituting the pressing portion or presser *k* of the spring which seats against the retaining-faces *f g* of the spindle-head. The two strands of the wire extend forwardly and inwardly from the presser, constituting a depressed loop *l* to permit the reception of the tongue *h* of the spindle-head and the rear enlarged end of the bobbin B. From this loop *l* the two strands of the wire extend outwardly and thence transversely, merging into each other at the middle portion of the wire and here constituting a bobbin-catch *m* for engaging the usual peripheral groove *n* at the rear end of the bobbin, thereby preventing endwise slipping of the bobbin on the spindle when the shuttle is in use. The spindle-spring thus made of wire furnishes in itself means for attaching it to the shuttle-body, spring-coils, a presser bearing against the spindle-head to hold the spindle in its two positions, and a bobbin-catch for holding the bobbin in place on the spindle.

Preferably the bobbin-spring D is further held in place in the shuttle by means of a transversely-extending pin *o*, extending crosswise of the shuttle-slot *e* and extending through the coils *j* of the spring, as shown in Figs. 3, 4, and 5. While this pin *o* is desirable, it is not essential, and in the modified form shown in Figs. 6 and 7 this pin is omitted, reliance being had upon the ends of the wire constituting the spring being embedded in the shuttle-body to hold the spring in place.

The spindle-spring presses outwardly against the spindle-head, thereby holding the bottom of the slot *d* firmly against the inner side of the shaft *b* with effective frictional resistance both when the spindle is in its operating position, as shown in Fig. 3, and when it is in its uplifted or open position for the removal and insertion of bobbins, as shown in Fig. 4. The presser *k* of the spindle-spring, it will be noted, has a very considerable available play between the bottom *i* of the slot *e* and the inner side of the spindle-head. Consequently it becomes possible to make the spring sufficiently powerful to efficiently compensate for any wear which may take place on the spindle-head. The spring is made sufficiently strong to seat firmly and with ample force upon the inner side of the shaft *d* itself when the spindle is removed, and consequently the spindle-head can wear to any extent until it wears through at the bottom of the slot *d* without impairing the holding efficiency of the spring. This is an important feature of the improved construction, since with the ordinary construction of loom-shuttle—such as is shown, for example, in Figs. 1 and 2 of the drawings annexed to Letters Patent of the United States No. 496,766, dated May 2, 1893—when the spindle-head becomes worn the spring is no longer efficient and the spindle must be removed and a new one inserted. With the present construction the life of the spindle is materially prolonged.

The bobbin-catch *m*, carried by the spring itself, performs efficiently the usual offices of bobbin-catches, automatically engaging the bobbin-groove *n* when the spindle is returned to its operating position, and the bobbin being automatically released therefrom when the spindle is elevated to the position shown in Fig. 4. The improved construction, however, provides a single instrumentality, serving both as the bobbin-catch and as the spindle-spring, thus greatly simplifying the construction of the shuttle. Another advantage of the present improved construction in this respect is that as the spindle is swung outwardly to the position shown in Fig. 4 the spindle-head acts upon the spindle-spring to slightly depress the same, thereby depressing the bobbin-catch *m*, and consequently facilitating the disengagement of the bobbin-catch from the bobbin-groove. This avoids entirely any danger of the bobbin-catch chipping the bobbin, which is so usual in the ordinary construction of spindles, this chipping damaging the bobbin and eventually rendering it unusable. To avoid this chipping, it has in the past been customary to clad the rear of the wooden bobbin with a sheet-metal rim, thus adding to the expense. This cladding is rendered wholly unnecessary by the present construction, which provides a yielding bobbin-catch which is operatively connected with the spindle-spring, so as to be automatically depressed when the spindle is lifted.

The improved construction obviates the use of all screws, which would tend to split the body of the shuttle, and obviates the presence of any parts on the outside of the shuttle which are apt to become loose and damage the product of the loom. As shown in Fig. 1, the only parts which appear on one side of the bobbin are the sunken ends of the shaft *b* (see Fig. 5) and the pin *o*, and, as heretofore stated and as shown in Fig. 7, the latter may be omitted. From the opposite side of the shuttle nothing can be seen, as is evident from an inspection of Fig. 5. Fig. 2 shows the appearance of the shuttle looking down upon its top, the contour of the shuttle-slot *e* being seen. An inspection of Figs. 3 and 4 shows that even less is seen by looking at the bottom of the shuttle. The spindle-spring is practically concealed. The entire mechanism of the shuttle consists of four parts only—the spindle, its shaft, and the spring, with its pin, and even this pin can be omitted. Another advantage of this construction is that the

spindle C is separable from the shaft and can be readily and quickly removed and replaced. This is an important feature, since in the hurry of removing and replacing bobbins, especially in the hands of careless operatives, the spindles are apt to become bent, thus in the usual construction necessitating the delay required to send the shuttle to the repair-shop. In accordance with the present invention when the spindle is uplifted, as shown in Fig. 4, a forward and downward pressure upon the spindle-head, which is readily applied, suffices to disconnect the spindle from its shaft.

The improved construction thus combines simplicity, economy, efficiency, and durability.

In the construction shown in Figs. 6 and 7 the several parts are the same, except that the single wire out of which the combined spindle-spring and bobbin-catch is made is bent in a different way to accomplish nearly the same results and the pin *o* is omitted. The drawings illustrate the manner in which the wire is bent so clearly as to render detail description, it is thought, unnecessary. It will be noted that in the construction shown in these figures the bobbin-catch is not moved when the spindle is turned on its pivot, and for this reason the construction shown in Figs. 3 to 5 is preferred.

The wire constituting the bobbin-catch *m* in both modifications thereof is suitably bent so as to afford an extended contact between the bobbin-catch and the bobbin. In both modifications illustrating the bobbin-catch the bobbin-catch is a freely-yielding one susceptible of considerable play, so that if a careless operative fails to push the bobbin home against the head of the spindle (as frequently occurs) and then swings the spindle down into place, thus forcing the enlarged end of the bobbin against the bobbin-catch, the latter will yield, and thus avoid damage either to itself, the bobbin, or the shuttle-body.

As shown in the modification illustrated in Figs. 6 and 7, the presser *j* of the spindle-spring is constituted by the middle portion of the wire, which furnishes a bent end or loop constituting the stop, against which the tongue *h* of the spindle is adapted to abut, thereby limiting the inward swing of the spindle, thus accomplishing the same office as the downwardly-extending portion of the loop *l* of the construction shown in Figs. 3 and 4.

I claim as my invention—

1. A shuttle having, in combination a shuttle-body having a slot at its rear end open at its top; a shaft extending transversely across said shuttle-slot; a spindle having a head provided with an open-mouthed slot on its outer side which embraces said shaft, the bottom of said spindle-slot bearing against the inner side of said shaft, said head being also provided with retaining-faces at an angle to each other both being below and behind said shaft when operative, and said head being also provided with a depending tongue against which the bobbin seats; a combined spindle-spring and bobbin-catch located in the shuttle-slot behind said shaft, and composed of a single piece of wire bent into shape to constitute spring-coils, a presser adapted to bear outwardly against the retaining-faces of the spindle-head, a bobbin-catch, and a depending loop uniting the bobbin-catch and presser accommodating the depending tongue of the spindle-head and serving as a stop therefor to limit the inward swing of the spindle, the ends of said wire being connected with the shuttle-body; and a pin extending transversely across said shuttle-slot and through the spring-coils of said spindle-spring, substantially as set forth.

2. A shuttle having, in combination, a shuttle-body having a slot at its rear end open at its top; a shaft extending transversely across said shuttle-slot; a spindle having a head provided with an open-mouthed slot on its outer side which embraces said shaft, the bottom of said spindle-slot bearing against the inner side of said shaft, said head being also provided with retaining-faces at an angle to each other both being below and behind said shaft when operative, and said head being also provided with a depending tongue against which the bobbin seats; and a combined spindle-spring and bobbin-catch located in the shuttle-slot behind said shaft, and composed of a single piece of wire bent into shape to constitute spring-coils, a presser adapted to bear outwardly against the retaining-faces of the spindle-head, a bobbin-catch, and a depending loop uniting the bobbin-catch and presser accommodating the depending tongue of the spindle-head and serving as a stop therefor to limit the inward swing of the spindle, the ends of said wire being connected with the shuttle-body, substantially as set forth.

3. A shuttle having, in combination, a shuttle-body having a slot at its rear end open at its top; a shaft extending transversely across said shuttle-slot; a spindle having a head provided with an open-mouthed slot on its outer side which embraces said shaft, the bottom of said spindle-slot bearing against the inner side of said shaft, and said head being also provided with retaining-faces at an angle to each other both being below and behind said shaft when operative; a combined spindle-spring and bobbin-catch located in the shuttle-slot behind said shaft, and composed of a single piece of wire bent into shape to constitute spring-coils, a presser adapted to bear outwardly against the retaining-faces of the spindle-head, and a bobbin-catch, the ends of said wire being connected with the shuttle-body, substantially as set forth.

4. A shuttle having, in combination, a shuttle-body; a shaft extending transversely across said shuttle; a spindle having a head provided with an open-mouthed slot on its outer side which embraces said shaft, the

bottom of said spindle-slot bearing against the inner side of said shaft, and said head being also provided with retaining-faces at an angle to each other both being below and behind said shaft when operative; a combined spindle-spring and bobbin-catch located behind said shaft, and composed of a single piece of wire bent into shape to constitute spring-coils, a presser adapted to bear outwardly against the retaining-faces of the spindle-head, and a bobbin-catch, substantially as set forth.

5. A shuttle having, in combination, a shuttle-body; a shaft extending transversely across said shuttle; a spindle turning on said shaft; and a combined spindle-spring and bobbin-catch composed of a single piece of wire bent into shape to constitute spring-coils, a presser adapted to bear against the spindle, and a bobbin-catch, substantially as set forth.

6. A shuttle having, in combination, a shuttle-body; a shaft extending transversely across said shuttle; a spindle turning on said shaft; a spindle-spring located behind said shaft, and composed of a single piece of wire bent into shape to constitute spring-coils, and a presser adapted to bear outwardly against the spindle; and a pin extending transversely across said shuttle and through the spring-coils of said spindle-spring, substantially as set forth.

7. A shuttle having, in combination, a shuttle-body; a spindle turning on said shaft; and a spindle-spring composed of a single piece of wire bent into shape to constitute spring-coils and a presser adapted to bear against the spindle, substantially as set forth.

8. A shuttle having, in combination, a shaft, a bobbin-spindle separably connected with said shaft by means of a slot in its head, the bottom of said slot bearing against the inner side of said shaft, a wire spindle-spring located behind the shaft and bearing upon the inner side of the spindle-head, and a yielding bobbin-catch integral with said spindle-spring, substantially as set forth.

9. A shuttle having, in combination a separable swinging bobbin-spindle, a wire spindle-spring coöperating with said spindle to maintain it in place, and a yielding bobbin-catch, integral with said spindle-spring, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN T. AHRENS.

Witnesses:
HENRY R. SMITH,
MICHAEL VOLK.