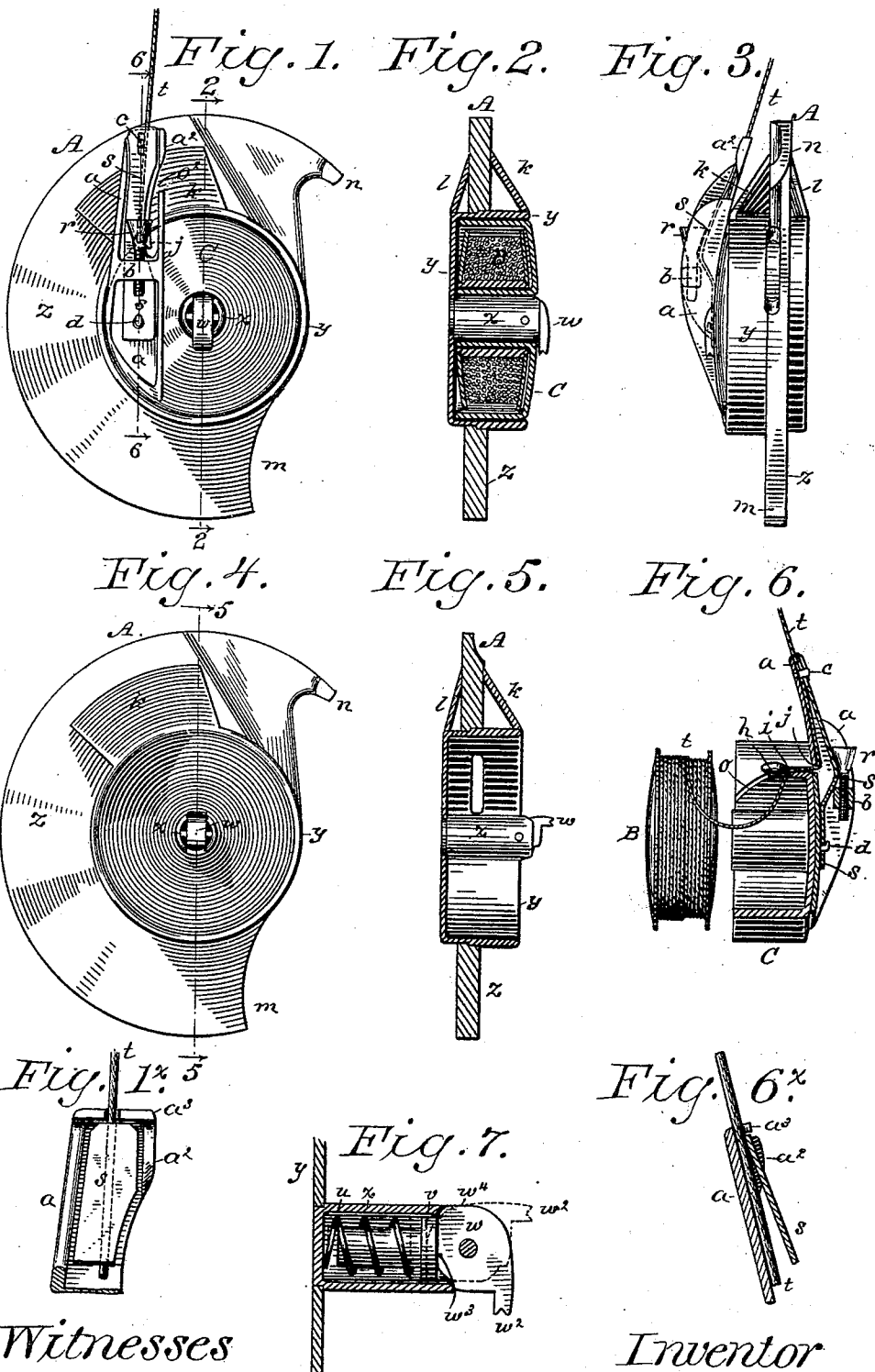


(No Model.)

A. M. LESLIE.
SHUTTLE.

No. 459,965.

Patented Sept. 22, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

ARTHUR M. LESLIE, OF CHICAGO, ILLINOIS.

SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 459,965, dated September 22, 1891.

Application filed July 31, 1886. Serial No. 209,655. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR M. LESLIE, a citizen of the United States, residing at Chicago, in the State of Illinois, have invented a new and useful Improvement in Shuttles and Bobbin-Cases, of which the following is a specification.

This invention relates to the construction of the rotary shuttles and non-rotary bobbin-cases of those lock-stitch sewing-machines in which the shuttle revolves or rotates continuously while the machine is in operation, and to the construction of their tension devices and bobbin-retainers.

Its objects are, first, to render the shuttle proper more cheaply and easily manufactured; secondly, to render the same at once light, well-balanced, and adapted to pass through the needle-loops freely; thirdly, to retain the bobbin-case and therewith the bobbin by an easily-actuated minute central retainer; fourthly, to facilitate adjusting a tension-spring with the utmost delicacy, and, fifthly, to so adjust and to mask a tension-spring applied flatwise with reference to the face of the shuttle.

The invention consists in certain novel combinations and arrangements of parts, some of them peculiarly constructed, as hereinafter set forth.

A sheet of drawings accompanies this specification as part thereof.

Figure 1 of the drawings is a magnified face view of a shuttle and bobbin-case illustrating this invention. Fig. 2 represents a section through all save the shuttle-spindle and bobbin and bobbin-case retainer on the line 2 2, Fig. 1. Fig. 3 is an edge view. Fig. 4 is a face view of the empty shuttle. Fig. 5 represents a section on the line 5 5, Fig. 4. Fig. 6 is an edge view of the bobbin and bobbin-case, partly in section, on the line 6 6, Fig. 1; and Fig. 7 represents a section of the shuttle-spindle and an elevation of the bobbin and bobbin-case retainer, double size as compared with the other figures, with the latter in its two positions of rest. Figs. 1^x and 6^x represent portions of Figs. 1 and 6 enlarged and slightly modified.

Like letters of reference indicate corresponding parts in the several figures.

The shuttle proper A of this device has for

its body a flat annular disk *z*, of hardened steel, made and hardened separately and readily ground on its periphery and sides to fit it to the groove of the shuttle-race. Said disk is cut away to form the nose *n* and heel *m* of the shuttle. Within its circular bore works a concentric-disk bobbin B and a non-rotary bobbin-case C, (hereinafter termed the "case,") which incloses the bobbin and tends to isolate it from the shuttle.

In another specification of even date herewith (application filed July 19, 1886, Serial No. 208,486) I describe such a shuttle having the non-rotary bobbin-case swiveled in the annular shuttle-disk, so as to be permanently attached, and I consider that shuttle a modification of the present invention as regards the shuttle proper.

In the particular shuttle to which this specification is confined an outer bobbin-case or cylinder *y*, of relatively soft (unhardened) metal, made and fitted with facility on a "screw-machine," is fixed within said bore of the disk *z*, so as to rotate therewith. A pair of loop-spreaders *l k* are fixedly attached to said disk *z* at their outer ends a short distance behind the nose of the shuttle, and in connection with said cylinder *y* they are attached to its extremities at their inner ends, as shown in Figs. 1 to 5. In both styles of the shuttle the bobbin-case and bobbin are balanced to a considerable and sufficient extent relatively to the disk by projections on its respective faces, and said loop-spreaders throw the needle-loops over the respective ends of the case.

The outer end of the shuttle-cylinder *y*, corresponding with the face of the shuttle, is open, and a central hollow spindle *x* is fixed in its inner end and projects perpendicular thereto, so as to form a pivotal support for the case C when the latter is in place, as shown in Figs. 1 and 2. Within the outer end of said spindle I pivot a minute retainer *w*, having a notched effective portion, which in one position, Figs. 1 and 2, projects beyond the circle of the spindle, so as to retain the case C and therewith the bobbin B, and in another position, Figs. 4 and 5, projects in line with the spindle, so as to offer no obstruction to removing and replacing the case and bobbin. It is held in its two positions by means shown in Fig.

7, where said effective portion or projection is marked w^2 , and two flat holding-surfaces at right angles to each other are marked, respectively, w^3 and w^4 . A follower v , with a spiral spring u behind it, acting upon said surface w^3 , as shown in full lines in the figure, holds the retainer in said effective position, Figs. 1 and 2. In turning it from this position, by applying a finger-nail to the notch of said projection w^2 , the spring u is compressed until the rounded apex between the two holding-surfaces passes the center of the follower v , when, acting upon said surface w^4 , the spring and follower tend to hold the retainer in its retracted position, Figs. 4 and 5, as represented by dotted lines in Fig. 7.

On the outer end or face of the case C a holding-arm a is fixedly attached, so as to project into contact with some part of the machine that is stationary relatively to the motion of the shuttle and to a point a short distance below the throat-plate, through which the bobbin-thread t is drawn, and a peculiarly-constructed tension-spring s to act on said thread is combined with this arm, together with a peculiar regulating-screw r , as shown in Figs. 1, 3, and 6. Said arm a is of trough shape, with a cross-bar b , which is centrally drilled lengthwise of the arm and screw-tapped to receive and coact with said screw r . The spring s is so constructed as to render a portion thereof inclined with reference to the depressed face of the arm, against which it is applied. (See Fig. 6.) It is also slotted near its respective ends to engage with a pair of studs c d , with which the arm is provided, as means for detachably holding it. It may be otherwise attached without materially changing it; but said inclined portion is a distinguishing feature of this spring. This coacts with a conical head, with which said screw r is constructed, so as to provide for great delicacy of adjustment and a nice regulation of the tension, and with the spring applied to the face of the arm the trough shape of the latter becomes essential and renders the spring and screw effectively masked against catching in the needle-loops.

In threading the bobbin-case and tension device the thread t is first drawn through an open slit o , Fig. 6, into a radial hole h in the case C. It is then drawn into a peripheral groove i , extending from said hole h to the arm a , and into an eye j in said arm beneath the spring s . Access to the latter is afforded by a slit o^2 cut through the "inner" edge of the arm a , as shown in Fig. 1. From said eye j the thread passes lengthwise of the spring between the free end of the latter and the face of the arm, being deflected under the spring in the threading operation by a rounded portion a^2 of the inner flange of the arm. In the working position of the arm the tension-screw r is vertical, with its head at top, as shown in Figs. 1, 3, and 6, so as to be readily reached through the cloth-plate opening for

regulating the tension without removing the bobbin-case, and the thread in passing to the throat-plate of the machine is drawn against said stud c , which keeps it central behind the spring. A notched end flange a^3 , Figs. 1^x and 6^x, may take the place of said stud c , its central notch serving to so guide the thread t .

I do not claim herein, in combination with a rotary shuttle and its disk-bobbin, a non-rotary bobbin-case having a cylindrical body which completely envelops the edges of the bobbin and provided with a threading-slit in its edge at the back of the case extending to a point midway between the disks of the bobbin, a peripheral groove leading therefrom to the face of the case, and a tension-guard and an upwardly-projecting arm attached to the face of the case, the arm comprising two parts, one of which is a longitudinal spring, together with a tension-screw uniting them, and one of said parts having a hook or threading-finger masked by said tension-guard, and a guide-hole or slot into which the under thread is directed by said finger, substantially as set forth; nor in combination with a rotary shuttle and its disk-bobbin, a non-rotary bobbin-case having a cylindrical body which envelops the edges of the bobbin and provided with a threading-slit in its edge at the back of the case extending to a point midway between the disks of the bobbin, a peripheral groove leading therefrom to the face of the case, and a tension-guard and an upwardly-projecting arm attached to the face of the case, the arm comprising two parts, one of which is a longitudinal spring, together with a tension-screw uniting them, and one of said parts having a thread-guide at the upper end of the arm, and one of them having a hook or threading-finger and a guide-hole at the perimeter of the body of the case, into which the under thread is directed by said finger, substantially as set forth, because said combinations are claimed in the specification forming part of my application for patent filed January 13, 1885, Serial No. 152,761.

Having thus described my said improvement in shuttles and bobbin-cases, I claim as my invention and desire to be patented under this specification—

1. A rotary shuttle having its body composed of an annular flat disk of hardened steel having a marginal recess at one point to form its nose and heel, while the perimeter of the disk takes the place of the customary marginal flange, and a hollow cylinder of relatively soft metal fitted to the bore of said disk, substantially as herein specified.

2. A rotary shuttle having an annular flat disk of hardened steel having a marginal recess at one point to form its nose and heel, while the perimeter of the disk takes the place of the customary marginal flange, and provided with loop-spreaders on its respective sides, in combination with a non-rotary bobbin-case within the bore of said disk pro-

jecting on its respective sides and masked by said loop-spreaders, substantially as herein specified.

3. In a rotary shuttle, a bobbin-retainer pivoted within the outer end of a hollow spindle and having an effective projection and two flat holding-surfaces, the latter at right angles to each other, in combination with a spiral spring and a follower within said spindle coacting with said surfaces alternately, substantially as herein specified.

4. In combination with a disk-bobbin, a non-rotary bobbin-case having a holding-arm which forms an abutment-surface, a tension-spring opposed to said surface and having an incline on its back, a regulating-screw which is vertical in the working position of the arm, having at its top a conical head which is conformed to said incline and coacts therewith, and a relatively-fixed tapped socket which

receives the threaded end of the screw, substantially as herein specified.

5. In combination with a rotary shuttle and its bobbin, a non-rotary bobbin-case having a holding-arm of trough shape, its depressed face forming an abutment-surface and its flanges supporting between them a cross-bar provided with a screw-socket, a tension-spring attached to said face of said arm and having an inclined surface on its back, and a regulating-screw working in said socket and having a conical head which coacts with said inclined surface, substantially as herein specified.

Signed at Chicago this 17th day of July, 1886.

ARTHUR M. LESLIE.

Witnesses:

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WOLFRED N. LOW.