(No Model.)

2 Sheets—Sheet 1.

# D. H. CAMPBELL.

## SEWING MACHINE SHUTTLE.

No. 374,937. Patented Dec. 20, 1887.

Fig. 1.

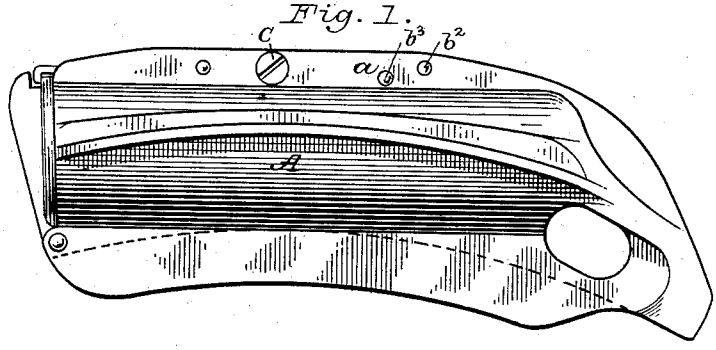



Fig. 2.

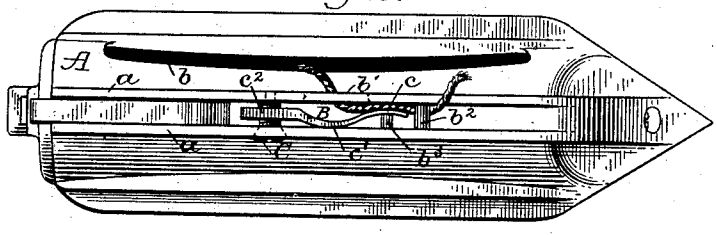



Fig. 3.

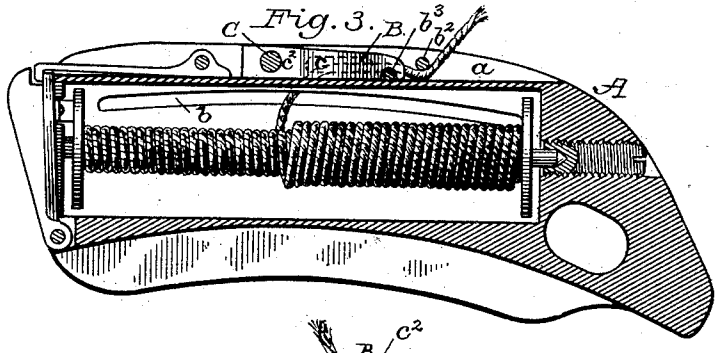
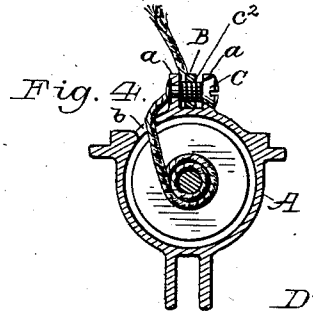



Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

# D. H. CAMPBELL.

## SEWING MACHINE SHUTTLE.

No. 374,937. Patented Dec. 20, 1887.

Fig. 5.

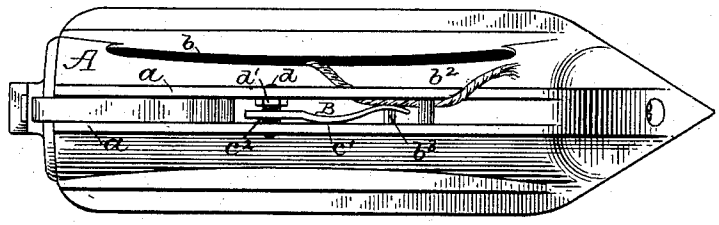



Fig. 6.

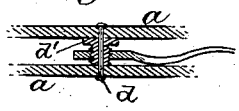



Fig. 7.

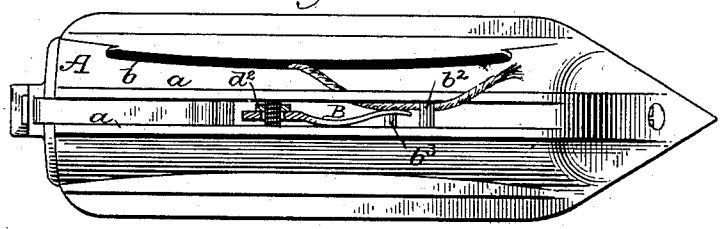
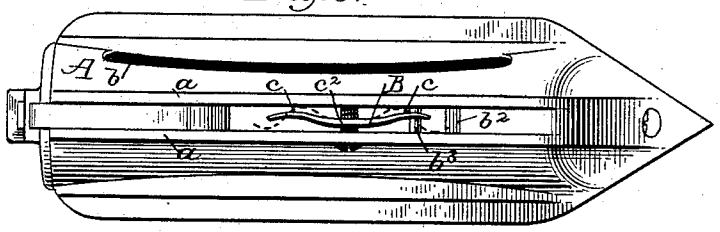



Fig. 8.

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# UNITED STATES PATENT OFFICE.

DUNCAN H. CAMPBELL, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO THE CAMPBELL MACHINE COMPANY, OF SAME PLACE.

## SEWING-MACHINE SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 374,937, dated December 20, 1887.

Application filed March 11, 1886. Serial No. 194,870. (No model.)

*To all whom it may concern:*

Be it known that I, DUNCAN H. CAMPBELL, of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Sewing-Machine Shuttles; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

In heavy sewing—as with waxed thread, for instance—a large heavy shuttle is employed and a high degree of tension is required upon the shuttle-thread, and at the same time provision must be made for maintaining the tension as nearly uniform as possible throughout long-continued operations upon any particular class of work, as well as for varying the degree of tension from time to time for work of different kinds.

However holes in and pins on a shuttle may be employed for affording frictional contact with the outgoing thread, with a consequent tension thereon, an adjustable spring is believed to be essential therewith for affording nice graduations and for convenience in making variations, or even securing uniform tension, inasmuch as the wear of the said pins and holes involves more or less variation in their operation as tension devices. The heavy tension-springs necessarily employed in this connection involve heavy strains on their adjusting-screws, with a consequent liability of derangement in the operative relations of the screw and spring, as well as derangement between the screw and its seat, and I have provided against these derangements in my shuttles, when constructed in their best form, by employing a spring in the form of a bent lever, and also by confining the tension-screw against any longitudinal movement. The spring being in the form of a lever and having a fulcrum between its junction with the screw and its thread-bearing or tension face, the screw is enabled to heavily strain the spring with comparatively little strain on the screw, and the vibrations of the free end of the spring incident to unevenness in the thread cannot pass beyond the fulcrum, and hence they cannot adversely affect the relations of the spring with the screw, or of the screw with its seat.

In its best form my wax-thread shuttle is provided with an exterior longitudinal groove afforded by parallel webs, one of which has a lateral thread-eye, and the tension-spring longitudinally occupies this groove and bears with its fulcrum against one side thereof, and its tension-face is forced toward or against the opposite side of said groove, while the adjusting-screw is located crosswise in said groove and is absolutely incapable of longitudinal movement.

My lever-spring in its best form is at one end sufficiently thick to enable it to be tapped for the reception of the adjusting-screw, and resiliency is mainly confined to that portion of the spring which extends from its fulcrum to its free end.

After fully describing in detail the several figures of the drawings illustrating embodiments of my invention in various forms, the features deemed novel will be specified in the several clauses of claim hereunto annexed.

Referring to the two sheets of drawings, Figures 1, 2, 3, and 4 illustrate one of my shuttles in what I deem its best form, respectively in side and top views and in longitudinal and lateral section. Fig. 5 in top view illustrates a similar shuttle having the same spring as shown in Fig. 1, but a screw differently constructed but arranged to rotate and control the spring without longitudinal movement. Fig. 6 is a sectional view of the spring and screw and a portion of the shuttle, Fig. 5. Fig. 7 illustrates a shuttle having a similar tension-spring controlled by a screw having neither a longitudinal nor rotative movement. Fig. 8 illustrates a shuttle having a two-armed spring controlled only by a rotative movement of the screw.

It is to be understood that the drawings illustrate my invention as applied to such wax-thread shuttles as are adapted to be used in machines heretofore patented to me.

These shuttles A have on their top or upper side a longitudinal groove, or, what amounts to the same thing, a space between two exterior longitudinal webs, *a*. The shuttle may contain a bobbin, as shown, in which case a long thread-slot, *b*, is provided, and said slot may be used in connection with a crosswise pin if a cop be employed in lieu of a bobbin; or the

thread can pass outwardly through apertures of other forms. The path of the thread from the slot *b* is through a hole, *b'*, into the space between the webs, and thence toward the nose of the shuttle beneath a transverse pin, $b^2$. A second transverse pin, $b^3$, is generally desirable at the rear of the pin for $b^2$, so lifting the thread as to favorably present it for compression against the inner surface of one of the webs by the face of the tension-spring B. The form of the spring may be varied without departure from certain portions of my invention, provided the shuttle has an exterior longitudinal groove and the spring lies longitudinally therein for compressing thread against one side of the groove, and it is provided with an adjusting-screw crosswise in said groove and confined against longitudinal movement. In its best form said spring B is in the form of a bent lever, and is what may be termed a "compound" spring, having a thread-bearing face at *c*, a fulcrum-point at *c'*, and a connection at $c^2$ with the adjusting-screw, as illustrated in Figs. 1 to 6, inclusive.

As shown in Figs. 1 to 4, inclusive, the screw C is crosswise in the longitudinal groove and occupies transverse end bearings in the webs *a*, and at its tip it is preferably slightly upset, or it may in any other way be so confined in position as to be free from longitudinal movement when it is rotated, and also rendered incapable of displacement, either as a result of its rotation or of the straining force of the tension-spring. The rear end of the spring at $c^2$ is of such thickness as to enable a hole therein to receive a sufficient number of screw-threads to enable the screw C to engage therewith, after the manner of a nut. With this form of spring and a screw so organized it will be seen that by rotating the screw the rear end of the spring will be moved toward one side of the groove and cause the spring to operate as a flexible bent lever, having its fulcrum at *c'*, thus causing the bearing or tension face *c* to be forced toward one side of the groove, while the opposite or thick end of the spring-lever is being forced by the screw toward the opposite side of said groove. This form of spring is highly efficient and of great durability; but its use is not dependent upon any special form of screw—as, for instance, as illustrated in Figs. 5 and 6, wherein the screw is in the form of a sleeve, filling the transverse space between the webs, and mounted on a transverse steel pin, *d*, riveted or otherwise secured in its holes through said webs. In this case the screw has a serrated flange, *d'*, which enables it to be rotated by means of a small screw-driver or other small device capable of engaging with its serrations, and the spring is tapped to the screw, as before described. It is not, however, to be understood that so long as the screw is confined against longitudinal movement it must of necessity be capable of rotation, although I prefer said rotation; nor is it to be understood that this form of spring must of necessity be tapped to the screw—as, for instance, as illustrated in Fig. 7, wherein the spring at its rear end has a hole larger than the screw, and the latter can neither move longitudinally nor rotatively, but is provided with a thumb-nut, $d^2$, which by its rotation affects the operation of the spring precisely as in Figs. 1 and 5. It is also to be understood that the main feature of my invention is not dependent upon a spring having but one tension-face, or upon one operating as an elastic lever, because the advantages incident to the control of a shuttle tension-spring by means of a screw which is confined longitudinally are obviously independent of any special form of spring—as, for instance, in Fig. 8 the spring is bow-shaped, has a tension-face, *c*, at each end, and centrally at $c^2$ it has a hole tapped to the screw, which is longitudinally confined, but capable of rotation, as in Fig. 1. In many cases—as in machines using specially slippery dry thread or oiled thread and requiring extra tension—this two-faced spring is specially desirable, and the two faces can also be provided for if the spring be in the form of two integral elastic levers, as clearly indicated in dotted lines in Fig. 8. It will be readily obvious that the webs *a* in this form of shuttle, when considered with reference to my invention, as affording bearings for the screw and a thread-seat with which the spring can co-operate, are of no more practical consequence than any other portion or portions of a shuttle would be, provided the shuttle has the longitudinal exterior groove and said portions were in like manner available or made available for my purpose.

It is now to be understood that it is not new to confine a tension-adjusting screw against longitudinal movement within the nose of a sewing-machine shuttle, nor to have said screw occupy a hole in a tension-spring; but in said prior shuttle the spring was pivoted on its screw and was provided with a series of holes or thread-eyes, which necessitated the outward swinging of the spring for enabling it to be threaded, and instead of being a bent lever and having a fulcrum between its screw and the point at which it compressed the thread, as in my shuttle, one end of said spring was secured to its adjusting-screw and the opposite end housed in a retaining-notch, and said spring at its point of connection with its screw was thin and not tapped, and therefore said spring was canted or tipped to conform to the angle of the thread on the screw, instead of being maintained in a position parallel with the face of the free end of the screw, as in my shuttle; and so, also, is it not new to employ an interior non-rotative screw in the nose of a shuttle and provided with a nut for engaging at its edge with one side of an interior elliptical spring.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, substantially as hereinbefore described, of a shuttle having an ex-

terior longitudinal groove formed between parallel webs, one of which has a lateral thread-eye, a tension-spring located longitudinally in said groove for compressing thread against one side thereof, and a spring-adjusting screw crosswise in said groove and confined against longitudinal movement.

2. The combination, substantially as hereinbefore described, of a shuttle having an exterior longitudinal groove formed between parallel webs, one of which has a lateral thread-eye, a tension-spring located longitudinally in said groove for compressing thread against one side thereof, a rotative spring-adjusting screw crosswise in said groove and confined against longitudinal movement, and near the free end of said spring a lateral pin, beneath which the thread passes on its way from the shuttle.

3. In a sewing-machine shuttle, the combination, substantially as hereinbefore described, of parallel webs affording a longitudinal groove, a tension-spring having a thick end provided with a tapped hole and bearing against both sides of said groove, and a rotative adjusting-screw occupying said tapped hole and secured to the body of the shuttle by bearings which confine it against longitudinal movement.

4. In a sewing-machine shuttle, the combination, substantially as hereinbefore described, of parallel webs affording a longitudinal groove, a tension-spring in the form of a bent lever mounted in said groove, having its fulcrum against one side thereof, and its free end bearing against the opposite side, and an adjusting-screw engaging with one end of said spring and tilting it on its fulcrum for causing its opposite end to compress thread on its way from the shuttle.

5. In a sewing-machine shuttle, the combination, substantially as hereinbefore described, of parallel webs affording a longitudinal groove, a tension-spring in the form of a bent lever within said groove and in contact with both sides thereof, and having at its rear end a tapped hole, and a rotative adjusting-screw occupying said hole and secured to the body of the shuttle by bearings in said web, which confine it against longitudinal movement.

DUNCAN H. CAMPBELL.

Witnesses:
ARTHUR H. METCALF,
J. F. BROWNING.