H. E. TOWLE.

Shuttle.

No. 108,409. Patented Oct. 18, 1870.

Fig. 1.

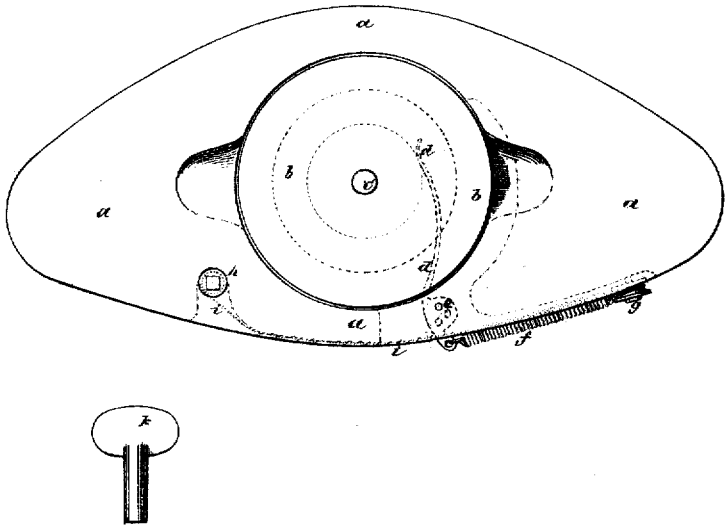
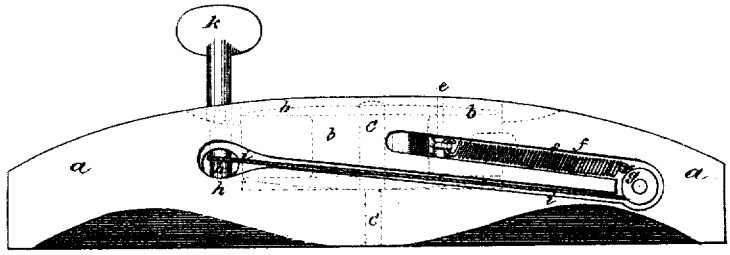


Fig. 2.



Witnesses,

T. W. Farnsworth

Fred'k L. Meeks

Inventor,

Hamilton E. Towle

United States Patent Office.

HAMILTON E. TOWLE, OF NEW YORK, N. Y.

Letters Patent No. 108,409, dated October 18, 1870; antedated October 12, 1870.

IMPROVEMENT IN SHUTTLES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, HAMILTON E. TOWLE, of New York, in the county and State of New York, have invented a certain new and useful Improvement in Shuttles, of which the following is a specification.

The said invention relates to the adjustment of the tension of the weft drawn from the shuttle, and is applicable to the regulation of the tension in sewing-machines, and to other similar purposes in which it may be desirable to regulate the degree of tension of a spring, and the method in which the tension is applied and varied within the range of its elasticity.

The variations of the tension on the weft require that the filling shall be strong enough to withstand the greatest ordinary strain to which it may be subjected, and the application of means by which the tension may be made more uniform permits the employment, therefore, of the finest thread and the highest rate of speed in the loom.

When the delivery from the bobbin, whether full or nearly empty, continues the same, with a uniform tension, the fabric will have a corresponding uniformity in texture, and present a straight and regular selvage.

The invention consists in the application of a spring and a lever that bears upon the filling in the spool, or bobbin, or quill of the shuttle, the total amount of the force exerted by the spring being adjusted by means of a key, and the manner of the application of the force so adjusted being regulated by the position of the fulcrum of the lever, so that, when the spool is nearly empty, and the spring is at its least extension, the leverage is most direct upon it, or at right angles; and, when the spool is quite full, and the strain upon the spring the greatest, its face is applied more angularly to the lever.

Description of the Drawing.

Figures 1 and 2 represent, respectively, a plan and elevation of a shuttle, with the spool or quill placed with its axis at right angles to the line of motion of the shuttle.

This position of the spool is preferred, because the angle of the delivery of the thread remains more nearly constant than is the case when the axis of the spool conforms with the longitudinal axis of the shuttle.

The shuttle *a* incases the spool *b*, which turns upon the axis *c*, and is pressed upon by the lever *d* bearing upon the filling.

The opposite end of the lever, beyond the fulcrum *e*, is attached to the spring *f*, that is stretched by the cord *i* passing over the pulley *g*, and winding around the barrel *h*, which may be turned by the key *k*.

By tightening up the cord with the key, the elongation and elastic force of the spring, and its action upon the lever, may be regulated at pleasure.

The friction of the pin or barrel in the material of the shuttle is sufficient to retain it for practical purposes.

In the position of the lever shown in the drawing, the end at the spool is upon the least amount of filling, and the tension of the spring is at its minimum; but the end of the lever to which the force of the spring is applied is at right angles to the direction of the force, and, therefore, receives the lessened force most advantageously.

In a similar manner, when the spool is full, and the spring most extended, and exercising its greatest force, the force of the spring is applied at an angle less than ninety degrees, and, therefore, at a disadvantage.

At the two extreme points, and between them, the varying tension of the spring is accompanied by a corresponding variation of the angle at which the tension or force is applied, so that the retaining power upon the spool, resulting from the application of the variable spring through the variable lever, remains unchanged.

The hub of the lever should be made of sufficiently large diameter to be bored with several holes for the reception of the pin upon which it turns, to enable the position of the fulcrum, and the consequent angularity of the leverage, to be changed or adjusted as may be required.

The same end may be attained by any other means of shifting the center, and the position of the center may, likewise, be adapted to the end of the lever bearing upon the spool, for the purpose of accomplishing the same result, by making its action more or less angular upon the spool, as the spool is more or less full.

I claim as my invention—

The combination, with the shuttle, of the spring, the lever, and the barrel for regulating the strength or tension of the spring, when constructed and combined substantially as described, so that the force of the spring and lever may be varied, to produce a uniform tension of the shuttle-thread, notwithstanding the decreasing size of the bobbin.

New York, June 24, 1869.

HAMILTON E. TOWLE.

Witnesses:

T. W. FARNSWORTH,

FREDK. L. MEEKS.