No. 795,427. PATENTED JULY 25, 1905.

H. CHADWICK & W. GERRARD.

AUTOMATIC OR SELF THREADING SHUTTLE.

APPLICATION FILED MAR. 20, 1905.

Fig. 1.

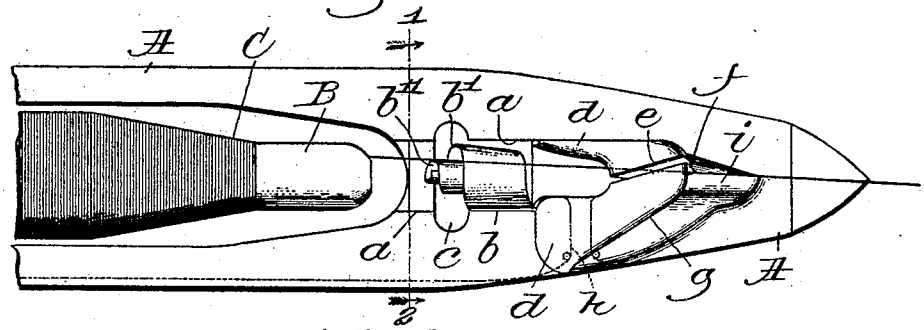


Fig. 2.

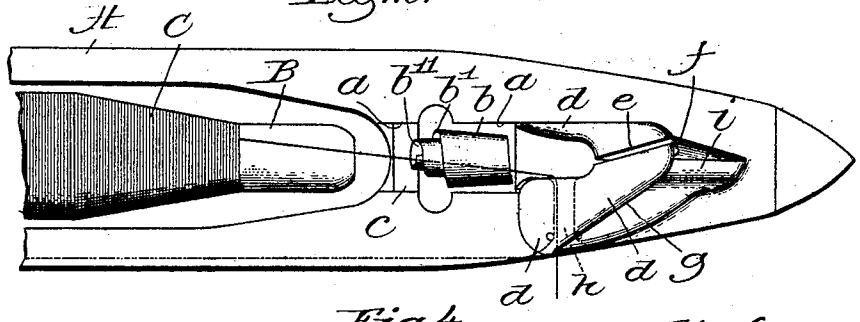


Fig. 3.

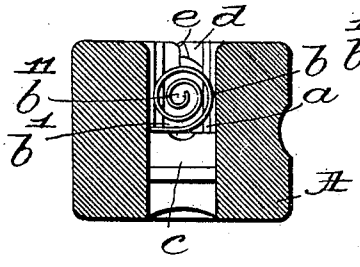


Fig. 4.

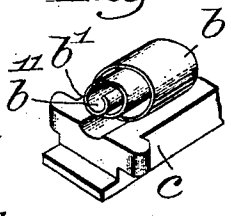


Fig. 6.

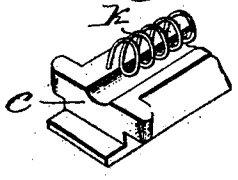
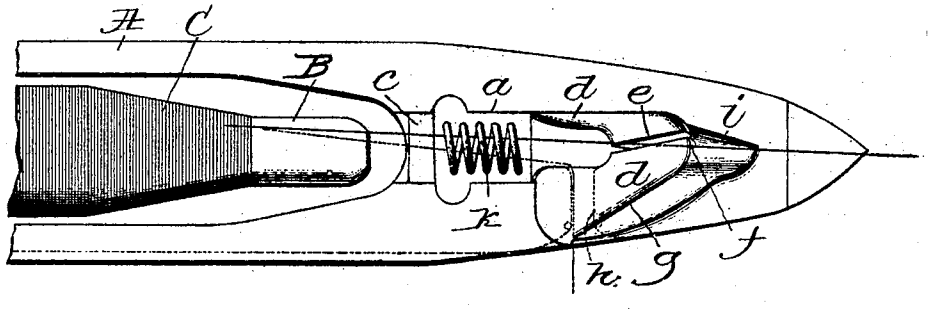


Fig. 5.



Witnesses:
Fred. S. Grumbach
A. W. Knapp.

Inventors.
Herbert Chadwick,
William Gerrard,
by Crosby & Gregory
Attys.

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HERBERT CHADWICK, OF RISHTON, AND WILLIAM GERRARD, OF BOLTON, ENGLAND, ASSIGNORS TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

AUTOMATIC OR SELF-THREADING SHUTTLE.

No. 795,427. Specification of Letters Patent. Patented July 25, 1905.

Application filed March 20, 1905. Serial No. 250,918.

To all whom it may concern:

Be it known that we, HERBERT CHADWICK, residing at Rishton, and WILLIAM GERRARD, residing at Bolton, in the county of Lancaster, England, subjects of King Edward VII of Great Britain, have invented certain new and useful Improvements in or Connected with Automatic or Self-Threading Shuttles, of which the following is a specification.

This invention has reference to shuttles, and particularly to improved means to be applied thereto for permitting the weft or filling contained on the bobbin or filling-carrier secured within the shuttle to automatically thread itself as the shuttle is first thrown forward across the loom and then back again, as is essential in looms provided with automatic mechanism for replenishing the filling when the last supply is practically exhausted, said means being also equally as well adapted for threading the shuttle by hand when introducing full shuttles to the ordinary or non-automatic looms.

The object of our invention is to provide in the shuttle simplified and novel means whereby the weft or filling unwound from the filling-carrier or bobbin will automatically thread itself in the delivery-eye of the shuttle, which said means can be applied to shuttles at much less cost than the present form of automatic self-threading devices and will reduce or to a certain extent prevent the ballooning of the weft or filling between the filling-carrier and the delivery-eye as it is unwound from said filling-carrier.

Our invention consists, essentially, in employing a volute or spring or a length of suitable metallic wire or the like formed into a spiral or with a series of spiral or worm or screw like convolutions, so that a filling-thread engaging with one of said convolutions will thread itself through all or several of the convolutions of the spring or coiled wire and pass through the central hollow opening of the same from end to end.

In the accompanying drawings, Figure 1 is a plan view of the threading end of a shuttle having our improvements applied, the filling being shown as commencing to thread itself in the thread engaging and directing device embodying our invention. Fig. 2 is a similar plan view to Fig. 1, showing the filling completely threaded through the engaging and directing device and the usual side eye of the shuttle. Fig. 3 is a transverse section taken on line 1 2 of Fig. 1. Fig. 4 is a perspective view of the thread engaging and directing device detached. Fig. 5 is a plan view similar to Figs. 1 and 2, showing a modification of the said device; and Fig. 6 is a perspective view of said modified device detached.

Referring to the drawings, A represents the shuttle, and B the bobbin or filling-carrier, having the weft or filling C wound thereon, the bobbin being secured in the ordinary bobbin-receiving opening of the shuttle A in the usual manner.

The shuttle-body at the threading end is recessed or provided with a longitudinal opening *a*, opposite the nose or tip of the bobbin B and leading from the bobbin-receiving opening, and in this recess *a* is secured in the same axial line as the filling-carrier or concentric therewith a coiled or spirally-formed strip of thin ribbon-like metal or other suitable material comprising our improved thread engaging and directing device *b*.

The outer end of the strip of metal forming the device *b* is flat and is secured to the bottom of the recess *a*, or in this instance to a block or plate *c*, removably secured in the bottom of the recess *a*. From the flat or horizontal portion the metal strip is coiled round and round spirally to form two or three volutes, leaving a continuous spiral passage between the volutes leading from the point *b'* to the interior *b''* of the inner coil, the latter forming an elongated substantially tubular passage substantially concentric with the axis of the bobbin.

In the example shown in the drawings there is secured in the outer end of the opening or recess *a* a metal block *d*, which may be integral with the block or plate *c* or separate therefrom. In said block *d* is a slot or thread-passage *e*, which guides the weft or filling under the horn *f* to insure the passage of said filling-thread by way of an undercut diagonal passage *g* to the side delivery-eye *h*, such thread-passage being substantially the same as in the Northrop type of automatically self-threading shuttle—such, for instance, as in United States Patent No. 568,207, dated September 22, 1896.

Beyond the outer end of the thread-passage *e* the body of the shuttle is grooved, as at *i*, to guide the filling-thread in a substantially

straight path prior to the same being completely threaded.

As is well known in the Northrop type of automatic filling-replenishing loom, such as shown in United States Patent No. 529,940 and others of later date, or in shuttle-changing looms, the free end of the filling-thread is secured to a fixed projection on the loom or filling-carrier magazine, and therefore when the filling-carrier, as B, with the full supply of filling thereon is inserted into the shuttle or a full shuttle is substituted for the exhausted one and the said shuttle is picked across the loom the filling is caused to unwind off the filling-carrier with a circular motion and in doing so it engages with or plays against the spiral device *b*, as illustrated at Fig. 1, and is guided to the entrance *b'* of the spiral thread-passage formed by the coiled metal plate, through which passage it is wound until it finally enters the elongated central portion or inner volute of the device, as shown at Fig. 2, this being effected as the shuttle makes its first throw across the loom. In the return throw of the shuttle the filling-thread which has previously entered the passage *e* and passed under or below the horn *f* is constrained to pass, as usual, through the undercut passage at *g* and enter the side delivery-eye *h* when the filling is completely threaded in the shuttle. After the filling has threaded itself into the volute or spiral device *b* it cannot escape therefrom and thereafter draws off the bobbin or carrier through the horizontal axis of the device substantially in axial alinement with the bobbin. The device reduces ballooning of the filling between it and the filling-carrier. By employing a longer device or bringing the inner end thereof as near as possible to the nose or tip of the filling-carrier ballooning of the filling-thread may be further minimized.

The device *b* may be made for right or left hand winding of the filling.

In the modification shown at Figs. 5 and 6 the device comprises a coil or spiral *k*, made of wire in the form of a spiral spring, or it may comprise a spiral spring, the play of the filling-thread against it when unwinding off the filling-carrier B causing such thread to enter one of the convolutions of the spring and by a screw-like action wind itself through the several convolutions until finally it travels through the center or longitudinal axial opening of the spring from end to end. If the thread or filling does not thread or wind itself through all the convolutions of the spring, this will not prevent or obstruct its traverse, although placing a little more tension thereon, and the filling cannot afterward escape or become disengaged from the device. One end of the coiled wire *k* may be secured in the wood of the shuttle or to a plate or block *c*, the block *c* being easily applied to or removed from the shuttle.

We do not confine ourselves to the particular form of spiral or coiled device *b* or *k* herein shown or to the material of which the same is made, as said device may be formed from any suitable material and in any suitable manner to accomplish the purpose of our invention, providing that it is so made that the thread or filling in unwinding off the bobbin or filling-carrier will readily engage or pass or can be passed into one or more of the convolutions or spiral passages of the device and will pass into the others or fully through the spiral passage by a screw or circular or like action, as before described, thereby securing the thread on the first throw of the shuttle and retaining control of it, whether such filling is completely threaded by passing through the side eye on the return stroke of the shuttle or any subsequent traverse of the shuttle in the same direction or fails to completely thread itself, in which case it will deliver from the device *b* or *k*. In such case the said device constitutes a species of leader which will enable the thread to draw off properly to be delivered independently of the delivery-eye of the shuttle.

To increase the drag on the filling, felt or the like may be applied in the path or traverse thereof in the well-known way.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a loom-shuttle having a delivery-eye and provided with a bobbin-receiving opening having a longitudinal, open recess at one end, means at the outer end of said recess to guide the thread to the delivery-eye, and a thread-engaging device located in the open recess near the tip and in axial alinement with the bobbin, said device having an elongated central opening and a spiral passage to engage and direct the thread into the opening as the thread whirls around upon leaving the bobbin, the recess affording free access of the thread to the entrance of the spiral passage while the longitudinal opening of said device retains the thread in proper position while permitting its unobstructed passage therethrough.

2. In a loom-shuttle having a delivery-eye and provided with a bobbin-receiving opening having a longitudinal, open recess at one end, means at the outer end of said recess to guide the thread to the delivery-eye, and an elongated volute or spirally-coiled thread-engaging device located in said open recess between the guiding means and the tip of the bobbin, in alinement and concentric with the axis of the latter, said device engaging and directing automatically the thread into the central opening thereof as it leaves the bobbin and confining it therein and also serving as a fixed leader from which the thread may draw directly to be delivered.

3. In a loom-shuttle having a delivery-eye

and provided with a bobbin-receiving opening having a longitudinal, open recess at one end, means at the outer end of said recess to guide automatically the thread to the delivery-eye, and a ribbon-like thread-engaging device bent to form an elongated volute or spiral and located in the open recess between said guiding means and the tip of the bobbin and having its central, longitudinal opening coaxial with the bobbin, the spiral or volute engaging and directing the thread to the central opening of said device and retaining it therein for direct delivery to the guiding means.

4. In a loom-shuttle having a delivery-eye and provided with a bobbin-receiving opening having a longitudinal, open recess at one end, means at the outer end of said recess to guide the thread to the delivery-eye, and a ribbon-like thread-engaging device bent to form a volute or spiral passage opening into a central, elongated opening having its longitudinal axis in alinement with the bobbin-axis, said device being located in the open recess in front of the bobbin-tip and the volute or spiral passage engaging the thread, as it leaves the bobbin and directing it into the central opening to be confined therein, the volute device also serving as a fixed leader from which the thread may draw directly to be delivered.

5. In an automatically self-threading loom-shuttle having a longitudinal bobbin-receiving opening, a side delivery-eye, and thread-passages *e*, *g*, between said opening and eye, an elongated volute or spirally-coiled thread engaging and confining device fixedly mounted on the shuttle near the tip of the bobbin and having its central opening in axial alinement with the bobbin.

In testimony whereof we affix our signatures in presence of two witnesses.

HERBERT CHADWICK.
WILLIAM GERRARD.

Witnesses to signature of Herbert Chadwick:

EWALD SIMPSON MOSELEY,
MALCOLM SMETHURST.

Witnesses to signature of William Gerrard:

CLAUDE GILLIES,
ROBERT THOMSON.