H. A. TITUS.

LOOM SHUTTLE.

APPLICATION FILED FEB. 6, 1909.

966,487.

Patented Aug. 9, 1910.

Fig. 1

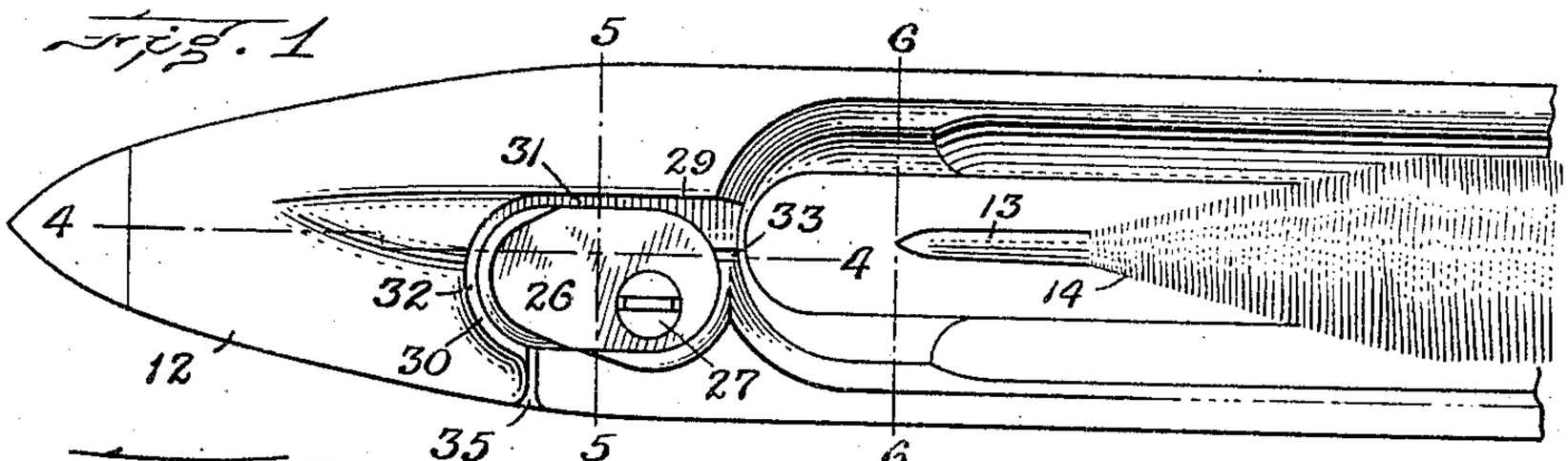



Fig. 2

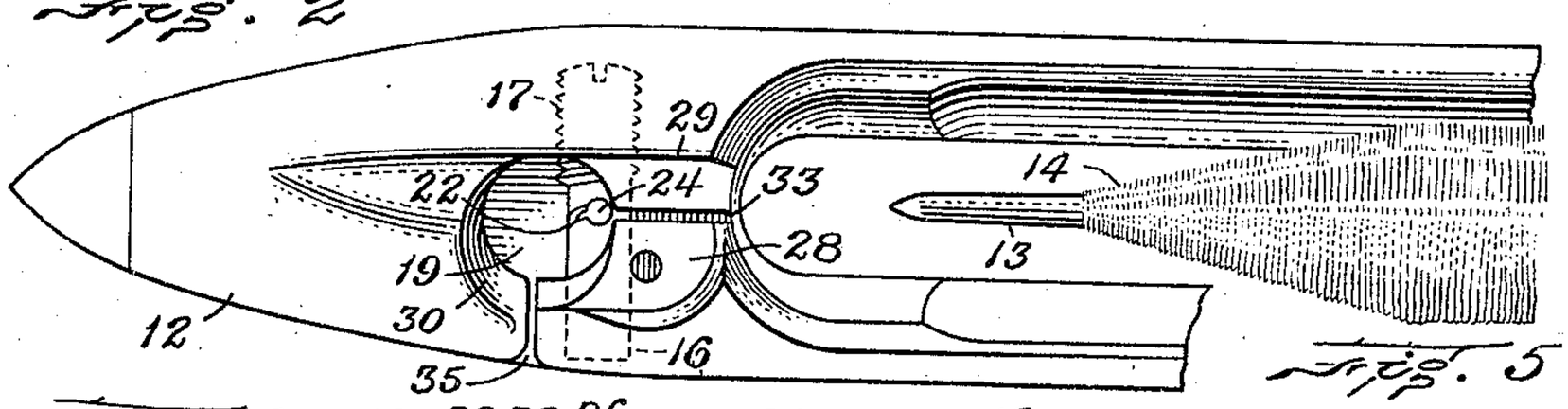



Fig. 5

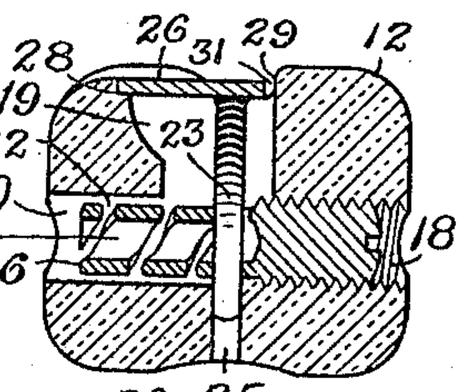



Fig. 4

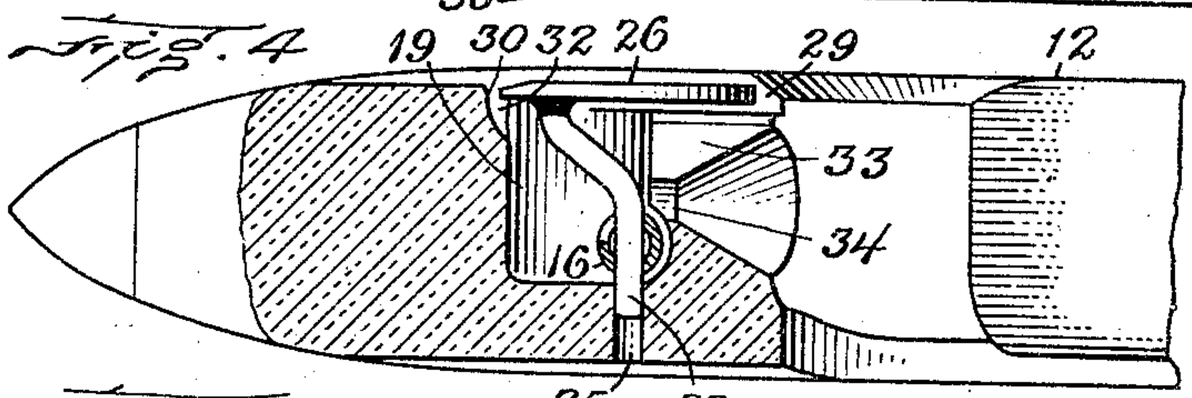



Fig. 3

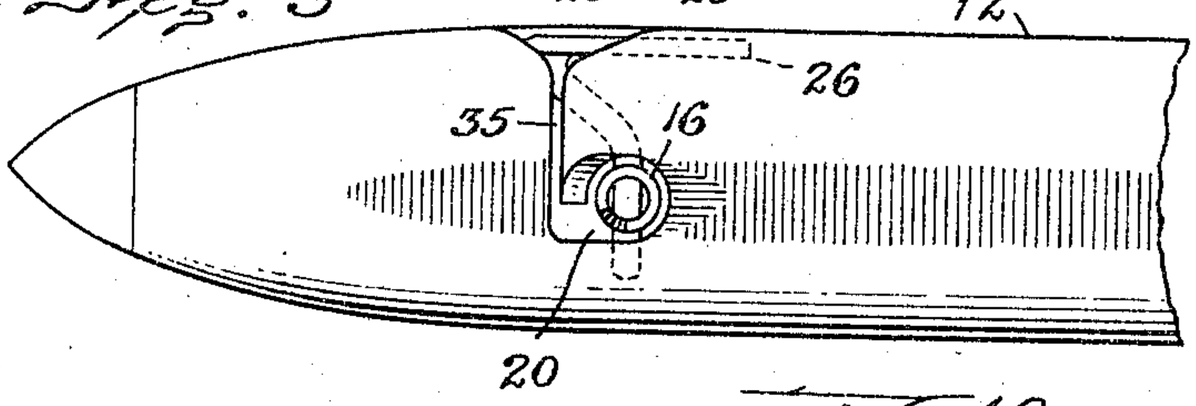



Fig. 6

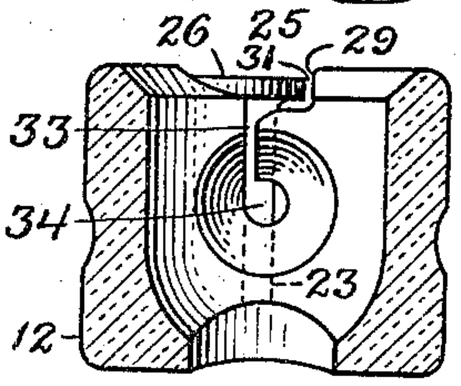



Fig. 10

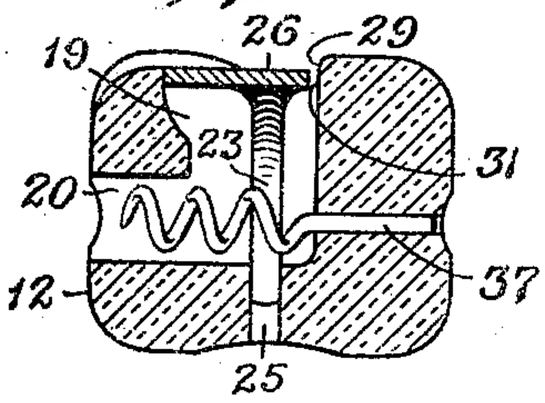



Fig. 8

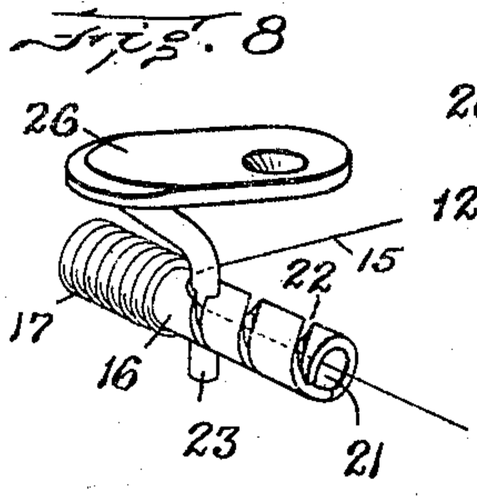



Fig. 7

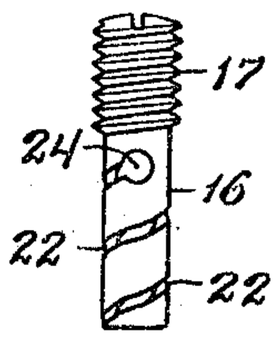
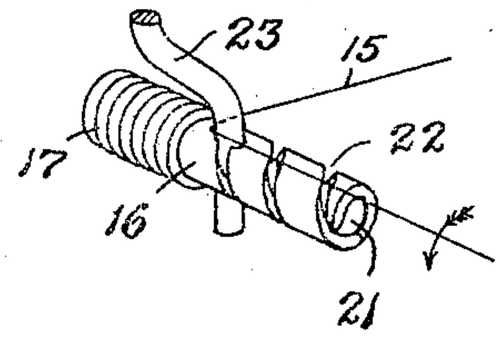



Fig. 9

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# UNITED STATES PATENT OFFICE.

HENRY A. TITUS, OF PROVIDENCE, RHODE ISLAND.

## LOOM-SHUTTLE.

966,487. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed February 6, 1909. Serial No. 476,399.

*To all whom it may concern:*

Be it known that I, HENRY A. TITUS, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Loom-Shuttles, of which the following as a specification.

This invention relates to threading devices for loom shuttles, and has for its object to provide threading means whereby the operator is enabled to quickly pass the weft thread or yarn from the shuttle spindle to and through the thread delivery eye, through which the thread passes from one side of the shuttle, a particular object of the invention being to prevent possibility of the displacement of the thread relatively to the thread eye by movements of the shuttle, and to provide a device adapted to withstand the shocks and jars incidental to the operation of the shuttle.

The invention is characterized by a shuttle eye-piece inserted in and rigidly secured to the shuttle, and having a longitudinal thread delivering passage, and a helical thread passage surrounding and communicating with the longitudinal passage, means being provided for guiding the thread into the inner portion of the helical passage, and the construction being such that the thread is adapted to be transferred from the exterior of the eye-piece to the interior thereof by a rotary movement of the end portion of the thread around the eye-piece, said movement causing the thread to pass through the helical passage until it is properly contained in the longitudinal passage of the eye-piece.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a top plan view of a portion of a shuttle embodying my invention. Fig. 2 represents a view similar to Fig. 1, the threading plate and its supporting post, hereinafter described, being removed. Fig. 3 represents a side elevation of a portion of the shuttle. Fig. 4 represents a section on line 4—4 of Fig. 1. Fig. 5 represents a section on line 5—5 of Fig. 1. Fig. 6 represents a section on line 6—6 of Fig. 1. Fig. 7 represents a side view of an eye-piece constructed in accordance with my invention, detached from the shuttle. Fig. 8 represents a perspective view of the eye-piece, the thread guiding post and the threading plate, said figure showing the direction of the thread after the threading operation. Fig. 9 represents a view similar to a portion of Fig. 8, showing the direction of the thread before the threading operation has been completed; and Fig. 10 represents a view similar to Fig. 5, showing a modification.

The same reference characters indicate the same parts in all the figures.

In the drawings,—12 represents a portion of the shuttle body, 13 represents a portion of the shuttle spindle on which is an accumulation 14 of weft thread or yarn, and 15 (Figs. 8 and 9) the portion of the thread located in and adjacent to the eye-piece, hereinafter described.

16 represents an eye-piece, the preferred construction of which is shown in Figs. 1 to 9, inclusive, said eye-piece being tubular at its outer end portion, and closed or solid at its inner end portion, the latter being externally screw-threaded, as shown at 17, and rigidly secured to the shuttle body by being driven into a socket 18 formed therein for its reception.

The shuttle body is provided with a chamber or cavity 19 at the inner end of the socket 18, said cavity having a cylindrical extension 20 which passes through one side of the shuttle body, as indicated in Fig. 5, and is in alinement with the socket 18. The outer portion of the eye-piece 16 projects across the inner end of the chamber 19, and into the extension 20, and is of smaller diameter than said extension, so that the outer portion of the eye-piece is entirely surrounded by an unobstructed space, as clearly shown by Figs. 3, 4, and 5. The outer portion of the eye-piece contains a longitudinal thread passage 21, and a helical thread passage 22 which surrounds and communicates with the longitudinal passage 21, said helical passage being in this case formed by cutting a helical slot through the tubular wall of the eye-piece, said slot opening at the outer end of the eye-piece and extending practically to the attached inner end portion.

The eye-piece, surrounded by an unobstructed space and having a helical thread passage communicating with a longitudinal thread passage, both opening at the outer end of the eye-piece, is an important characteristic of my invention, and enables the thread 15 to be threaded through the eye-piece and properly engaged therewith by moving the thread around the eye-piece, and thus causing it to first enter the inner end

of the helical passage 22, and then move along said passage until it has passed through all parts of the helical passage and has been transferred from the exterior to the interior of the eye-piece, as illustrated by Figs. 8 and 9, Fig. 9 showing the thread before it has passed through the helical passage 22, while Fig. 8 shows the thread after it has passed through said passage, and has been properly threaded through the eye-piece.

Means are provided for guiding the thread from the spindle 13 to the inner end of the helical passage 22, said means in the best embodiment of my invention at present known to me, being as follows:—23 represents a post which is inserted in sockets 24 formed for its reception in the eye-piece at the inner end of the helical passage 22, said post preferably projecting below the eye-piece, as indicated in Figs. 4, 5, 8, and 9, its lower end entering a socket 25 in the shuttle body. The opposite end portion of the post is curved, as shown in Figs. 4 and 8, and projects into the chamber 19. 26 represents a threading plate affixed to the outer end of the post 23, said plate covering the greater portion of the chamber 19, and being secured to the shuttle body partly by the post 23, and partly by a screw 27 inserted in a seat 28 (Fig. 2) at one side of the chamber 19.

A portion of the outer side of the shuttle body is cut away to form a wall or shoulder 29 extending along one portion of the edge of the threading plate 26, and another portion is cut away to form a wall or shoulder 30 extending along another portion of the edge of the threading plate. The shuttle walls 29 and 30 and the adjacent edge portions of the threading plate form thread passages 31 and 32 which communicate with the chamber 19, as shown in Figs. 4 and 5.

The shuttle body is provided with an inner slot 33 which communicates with the passage 31, as shown in Fig. 6, the inner end of said slot being enlarged to form a thread guide 34 which is in alinement with the spindle 13, and is adapted to conduct the thread to the point where it engages the post 23, as indicated in Fig. 8. The inner slot 33 is formed in the portion of the shuttle body which intervenes between the chamber 19 and the spindle-containing chamber of the shuttle.

35 represents an outer slot which extends through one side of the shuttle, and connects the passage 32 with the extension 20 of the chamber 19, as indicated in Figs. 1 and 3.

Owing to the fact that one end of the eye-piece is screw threaded, its accurate location for use may be readily secured as by means of a screw driver. It is not driven to place and can be inserted through the opening of socket 18 to the exact degree necessary to properly locate its helical passage. This firm mounting of the eye-piece by means of one end only, serves another purpose in that the other end of the eye-piece may be completely surrounded by an annular space as clearly shown in the drawings. This unsupported end of the eye-piece is formed with a longitudinal passage, the bore of which is tubular and formed with at least one complete helical passage 22 so that the wall of the eye-piece forms a complete spiral barrier to the escape of the thread. If the helical passage comprised less than at least one complete turn, the thread would be liable to escape from the longitudinal passage at the end of the throw of the shuttle beyond the selvage of the cloth; that is, when the shuttle stops and returns, the thread is slackened and is liable to escape from the eye-piece, if a complete barrier to its escape is not presented. Then of course if the outer wall of the eye-piece were in contact at any point with the inner wall of the opening, the thread would be liable to become caught and to break if it starts to escape from the eye-piece. Hence, according to my invention, the cylindrical opening 20 is sufficiently larger than the external diameter of the eye-piece to form a complete annular space. This of course is necessary when the spiral or helix includes at least one complete turn because the thread must be carried around the outer side of the eye-piece in finding its way through the helical passage to the inside of the eye-piece.

The operation of threading the shuttle is as follows:—The operator first takes the leading end of the thread into the passage 31, the thread passing under the portion of the edge of the threading plate which forms a part of said passage, and entering the chamber 19, the inner slot 33, and guide 34. The movement of the leading end of the thread is continued through the passage 32 and the outer slot 35, until the leading end is introduced into the cavity extension 20. The thread now occupies the position shown in Fig. 9, the bend of the thread having been guided by the curved portion of the post 23, to the periphery of the eye piece at the inner end of the helical passage 22, so that the outer stretch of the thread extends along the exterior of the eye-piece. The operator now imparts a circular lateral movement to the outer stretch of the thread in the direction indicated by the arrow in Fig. 9, thus causing the thread to move inwardly through the helical passage 22, the inward movement of the thread commencing at the base of the post 23, and progressing along the passage 22 until the outer stretch is within the longitudinal passage 21, as shown in Fig. 8. The thread is thus engaged with the eye-piece in such manner that it cannot escape therefrom in a lateral direction. The

friction developed by the abrupt turn of the thread where it bears on the post 23 imparts tension to the thread. The curved form of the post 23 is such that the thread, when it first passes under the threading plate and bears against the outer portion of the curved post, is guided by the curvature of the post to the position shown in Fig. 9.

It should be noted that the exterior of the eye piece has no projection which obstructs the space surrounding the eye piece. In other words, the exterior of the eye piece is formed to permit the unobstructed passage of a stretch of thread around it in the operation of passing the thread through the eye-piece as described.

In Fig. 10, I show a modified construction of the eye-piece in which the piece is made from a length of wire helically coiled, the convolutions surrounding a longitudinal thread passage which is the equivalent of the passage 21, while the helical space between the convolutions constitutes an equivalent of the helical passage 22. One end of the wire, from which the eye-piece is made, is shown as forming a shank 37 which is embedded in the shuttle body. The post 23 may be passed between two convolutions of the helical wire.

I claim:

1. A shuttle eye-piece having one end externally screw threaded and provided at its other end with a longitudinal thread passage the wall of said passage being tubular and formed with a complete helical passage whereby the material of the eye-piece forms a complete spiral barrier to the escape of the thread from the longitudinal passage.

2. A shuttle having an eye-piece affixed at its inner portion to the shuttle body, its outer portion being surrounded by an unobstructed space and provided with a longitudinal thread passage, and with a helical thread passage surrounding and communicating with the longitudinal passage, and means for guiding a thread from the shuttle spindle to said space, said means including a post projecting from the eye-piece at the inner portion of the helical passage.

3. A shuttle having an eye-piece affixed at its inner poriton to the shuttle body, its outer portion being surrounded by an unobstructed space and provided with a longitudinal thread passage, and with a helical thread passage surrounding and communicating with the longitudinal passage, a post projecting from the eye-piece at the inner portion of the helical passage, a threading plate supported by the post, portions of said plate forming walls of thread-guiding passages, the shuttle body having complemental walls completing said passages, and inner and outer slots communicating with said passages, the inner slot guiding the thread from the spindle to the post, while the outer slot guides the thread from the threading plate to the space surrounding the eye-piece.

4. A shuttle having its body formed with a substantially cylindrical opening in one side and with a thread passage leading to said opening, an eye-piece affixed at one end to said body and having its other end projecting into the said opening and sufficiently smaller than the opening to form a complete annular space between it and the wall of the opening, the portion of the eye-piece which is surrounded by said annular space being provided with a helical thread passage forming a complete spiral.

In testimony whereof I have affixed my signature, in presence of two witnesses.

HENRY A. TITUS.

Witnesses:
OSCAR LAPHAM,
JOHN E. TOBIN.