

H. L. LITCHFIELD.  
HAND THREADING LOOM SHUTTLE.  
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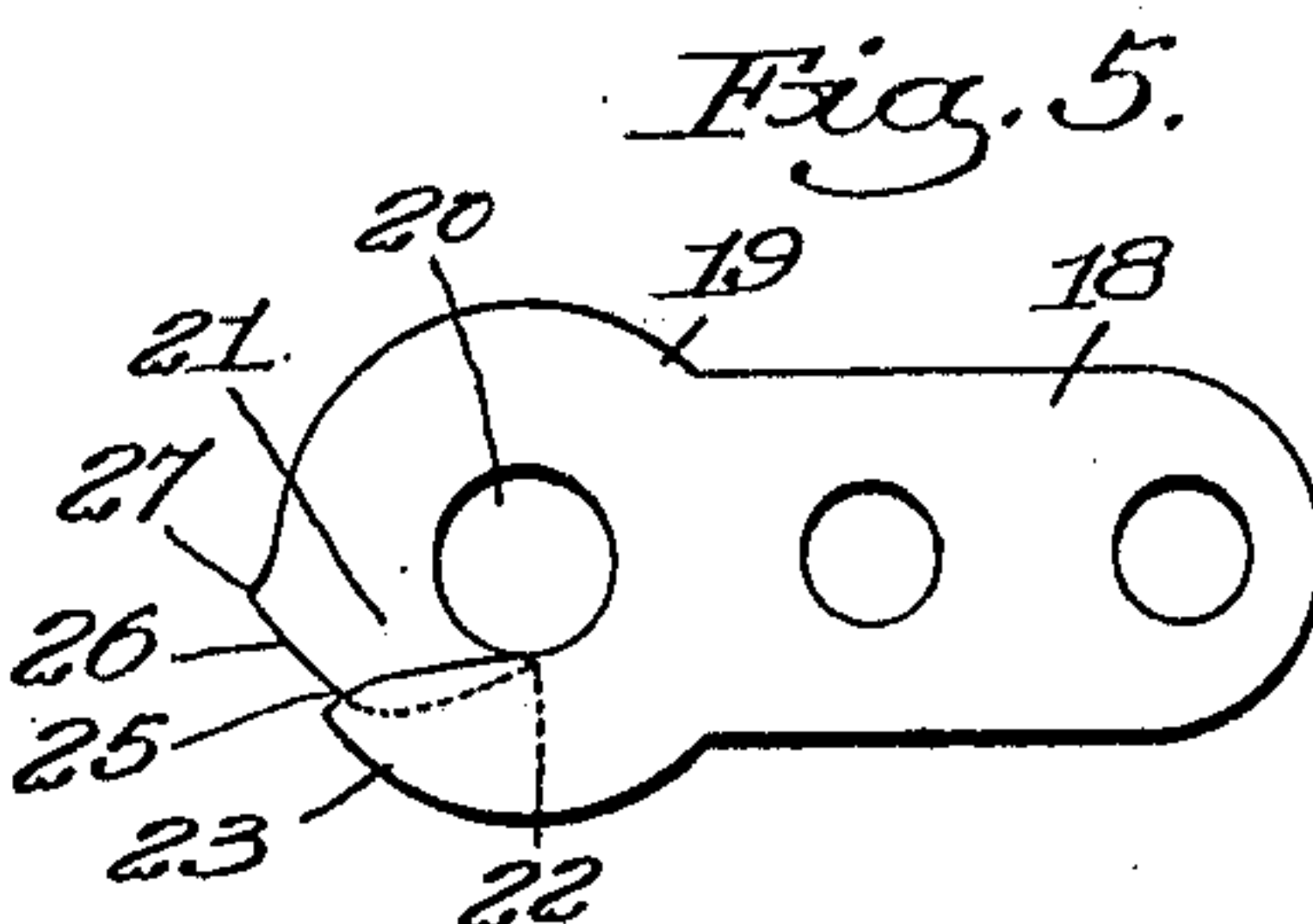
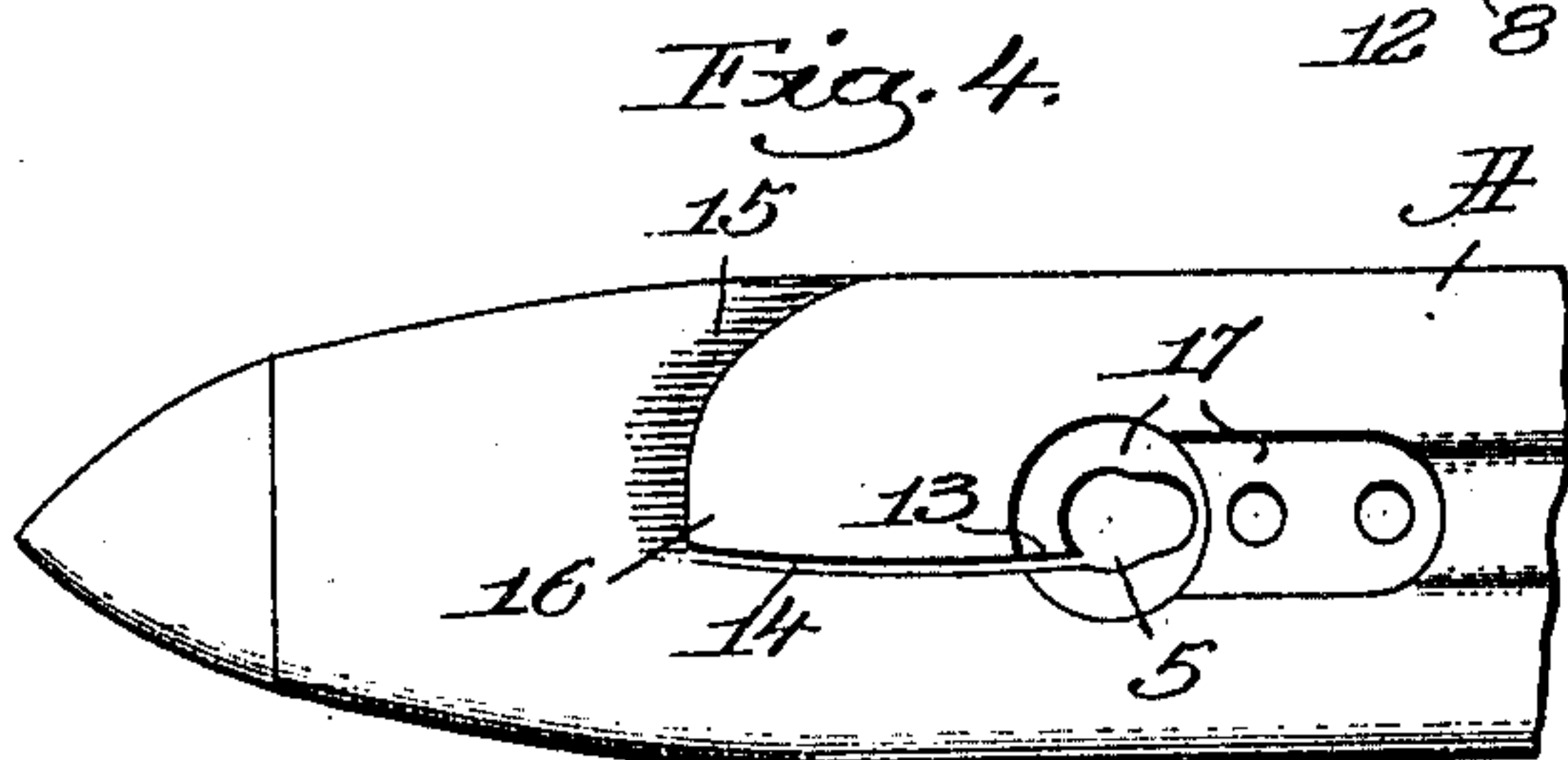
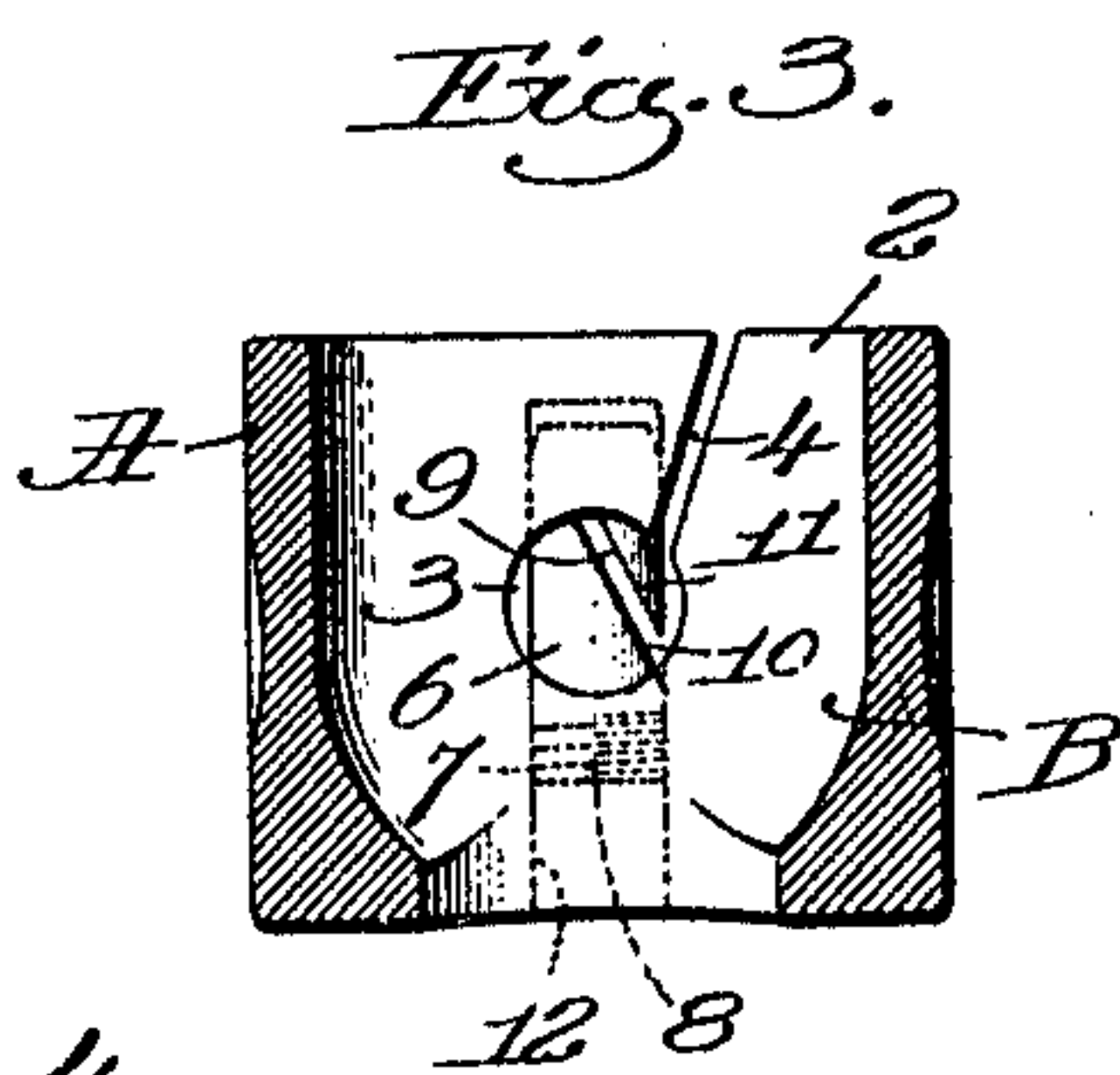
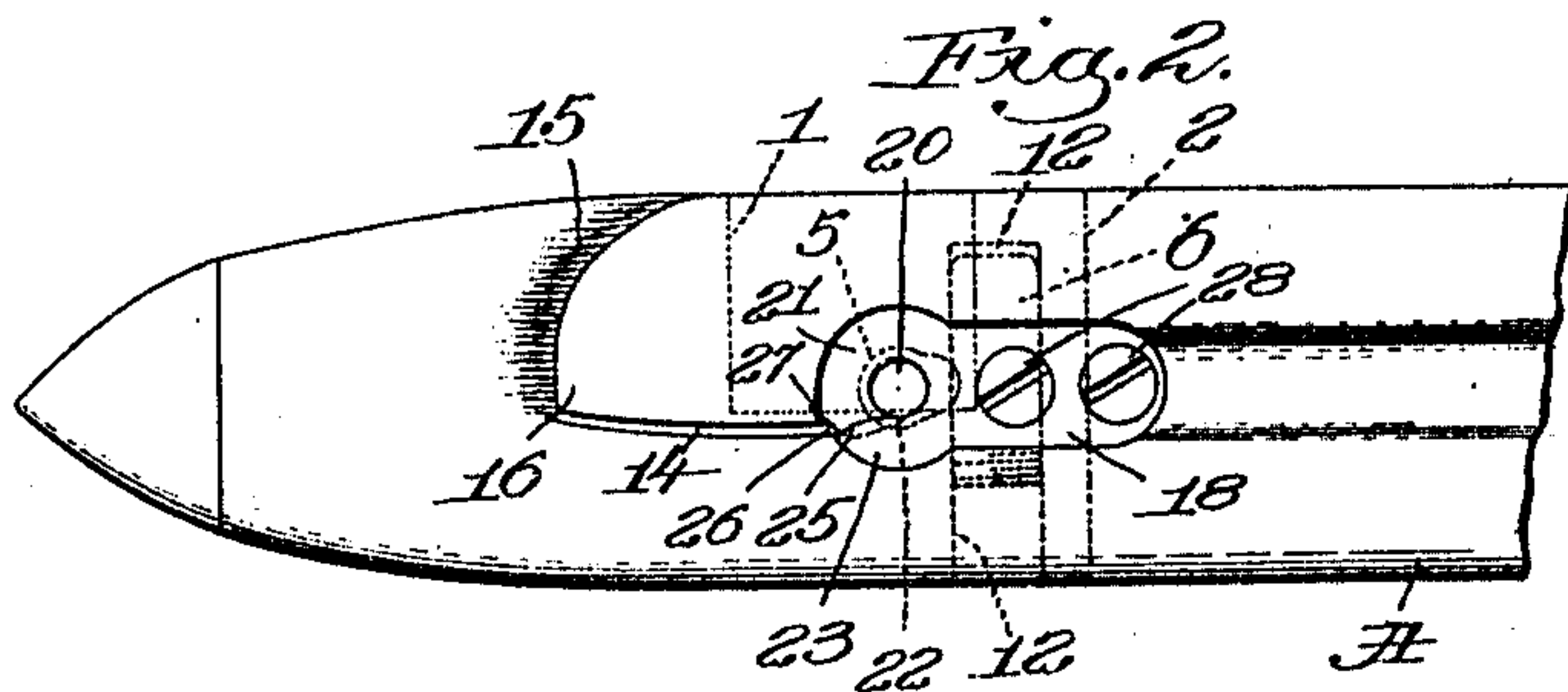
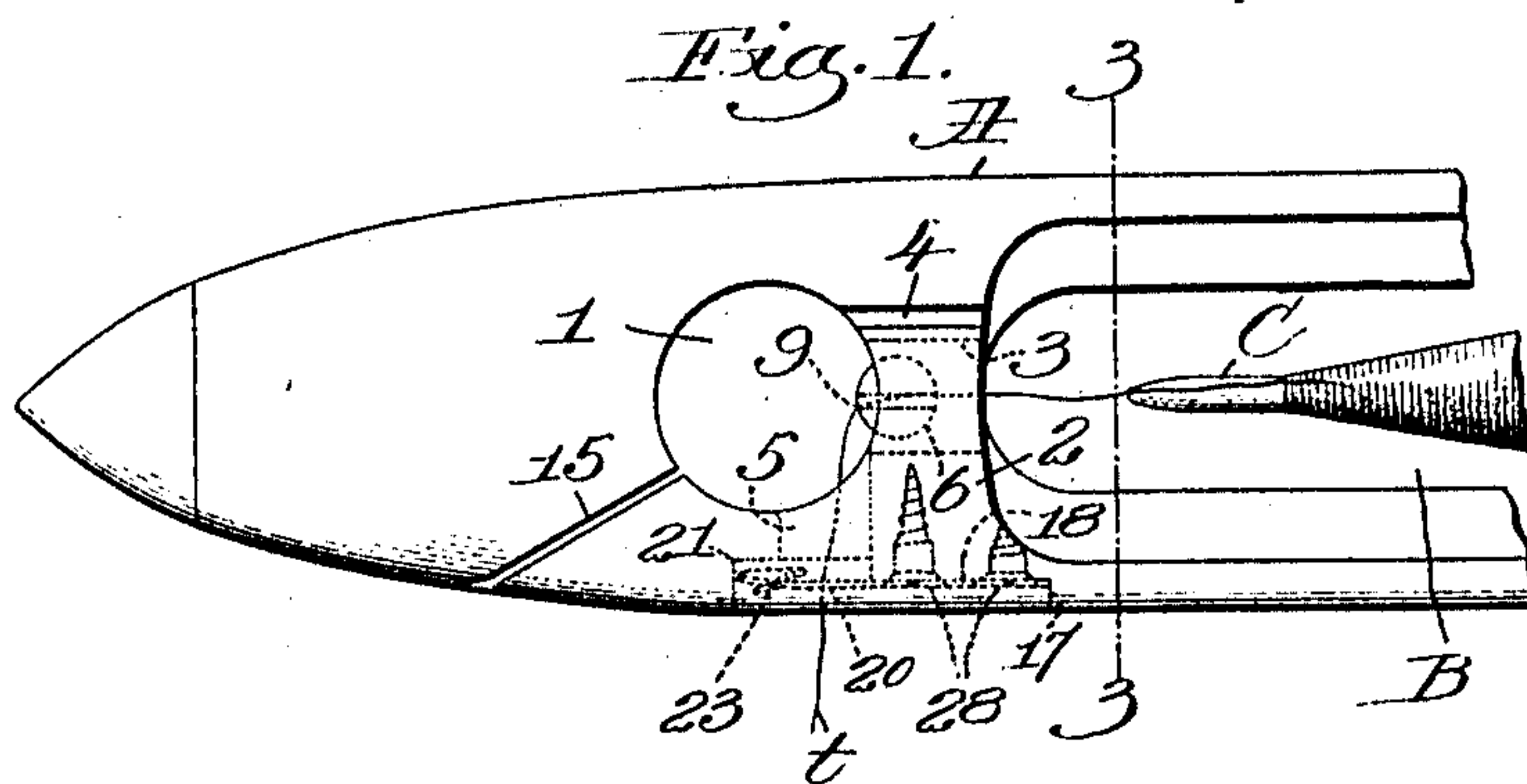


Fig. 6.

Witnesses:

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Fig. 7.

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## HAND-THREADING LOOM-SHUTTLE.

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Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, HERBERT L. LITCHFIELD, a citizen of the United States, and resident of Southbridge, county of Worcester, State of Massachusetts, have invented an Improvement in Hand-Threading Loom-Shuttles, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of a novel, simple and efficient loom shuttle so constructed and arranged that the thread of filling is guided or directed by the hand of the weaver to the delivery-eye of the shuttle, my present invention relating especially to the means for governing and directing the thread in the threading operation, and the means for controlling the thread after the shuttle has been threaded.

In the present embodiment of my invention the thread is led from the usual bobbin-recess through a longitudinal thread-passage and around a thread-guide through the delivery-eye at the side of the shuttle. This thread-guide is peculiarly constructed, so that it not only performs the function of a guide, but it also acts as a retainer to hold the thread in the passage and prevent its escape therefrom, and it also serves as a tension device, being mounted in the shuttle in such manner that it can be readily adjusted manually to vary the tension on the thread without interfering in any way with its thread-guiding and retaining functions.

I have also provided a novel and highly efficient thread-controller, which is mounted on the shuttle-body at the outer end of the eye, to facilitate the entrance of the thread thereinto in the threading operation and thereafter to prevent any accidental escape of the thread from the eye to unthread the shuttle.

The construction as a whole is simple, and the construction is such that the manufacture and assemblage of the various parts is low in cost and of easy accomplishment.

The various novel features of my invention will be fully described hereinafter and particularly pointed out in the following claims.

Figure 1 is a top plan view of the thread-delivering or forward end of a shuttle with one embodiment of my invention applied thereto; Fig. 2 is a front-side elevation thereof, showing the thread-controller at the outer end of the delivery-eye, the thread-

guiding, retaining and tension device being indicated by dotted lines; Fig. 3 is a transverse section taken on the line 3—3, Fig. 1, looking toward the left; Fig. 4 is a view similar to Fig. 2, but with the thread-controller removed; Fig. 5 is an enlarged view of the controller, detached; Fig. 6 is a left-hand elevation thereof; Fig. 7 is a detached view in elevation of the thread-guide and retainer.

I have herein shown my invention as applied to a shuttle of usual form, the body A having a recess B for the cop or bobbin C, Fig. 1, and herein the body is shown as having a cylindrical recess or well 1 forward of the recess B and separated therefrom by a transverse wall 2, through which passes a tubular thread-passage 3, leading from the bobbin-recess substantially in alinement with the tip of the bobbin, the recess 1 being formed by boring into the shuttle-body from its top. The thread-passage 3 opens into such recess, and the wall 2 has an inlet-slot 4 made by a saw cut, said slot leading from the top of the body A downward and inclining frontward until it intersects the passage 3 at the upper part thereof and back of its center, as shown in Fig. 3.

The side of the shuttle-body at which the thread is delivered is considered the front of the shuttle, for the purposes of this invention, hence it will be seen that the inlet-slot 4 extends longitudinally of the shuttle but it is inclined in a downward and forward direction.

A delivery-eye 5 leads from the front side of the shuttle into the recess 1, substantially at right angles to the thread-passage 3, and at the forward end of this passage I provide an upright post or guide around which the thread draws as its direction of movement is changed. In the present embodiment of my invention the guide is preferably made as a post or stud having a cylindrical body 6, Fig. 7, externally screw-threaded at 7 at or near its lower end, and provided with a nick 8.

Above the threaded portion 7 the body is diagonally slotted at 9, in a plane intersecting its longitudinal axis and inclined thereto, such slot being easily made as a saw-cut, the open lower end of the slot being indicated at 10, the upper end of the slot being closed and within the body, as will be manifest. This slot receives the thread as it passes through the passage 3, as will



be explained, and it forms at the upper part of the body a downturned hook 11, the point of which is at the lower, open end of the slot, the inner face of the hook being flat and inclined, while its outer face is cylindrical and coincides with the exterior of the body 6, as will be manifest.

An upright hole 12, see dotted lines Figs. 2 and 3, is bored into the shuttle-body extending from its bottom upward into the wall 2 at the forward end of the thread-passage, and into the hole 12 the thread-guide is screwed, until its upper part extends into the passage, as shown in Fig. 3, with the thread-slot 9 diagonally crossing the passage oppositely to the inlet-slot 4. The open end 10 of the thread-slot 9 is at a distance below the bottom of the inlet-slot, and also below and back of the center of the thread-passage, Fig. 3, while the upper end of the thread-slot is at or near the top of the passage 3 and substantially above the center thereof.

In the threading operation the weaver takes the thread of filling leading from the bobbin C and with a forward movement of the hand draws the thread into the inlet-slot 4, the pull on the thread drawing it down such slot into the passage 3, and around the convex face of the hook 11 as the thread enters the delivery-eye, the motion of the thread carrying it under the point of the hook and up into the threading-slot 9. The thread is now permanently confined in the passage 3, and cannot escape therefrom, for as it is drawn along it has a constant tendency to slide upward over the inclined bottom of the thread-slot 9 toward the closed upper end thereof, and the greater part of the length of the hook 11 is interposed between the open end 10 of the thread-slot and the bottom of the inlet-slot 4.

Should a loop of thread be thrown forward off the tip of the bobbin and into the open top of the inlet-slot the thread cannot escape from the control of the hook. This thread-retaining function of the guide or post 6 is very important, as it insures the retention of the thread in the passage 3 after it has once entered thereinto.

As the thread traverses the lower face of the slot 9 a drag or tension is exerted, and it will be at its minimum when the least deflection of the thread occurs as it traverses the thread-slot.

By turning the body 6 in the hole 12, which is easily done by engaging the nick 8 with a screw-driver, the thread-slot can be changed angularly with relation to the thread-passage 3, so as to increase the deflection of the thread and thereby increase the tension exerted thereupon. Such angular adjustment of the thread-guide does not, however, interfere with the guiding

function thereof nor with its function as a thread-retainer.

The delivery-eye 5 has a slot 13, Fig. 4, in its forward wall, where the lateral saw-cut 14 of the threading-slot intersects it, said cut 14 extending inward from the front side of the shuttle-body into the recess 1 and meeting the upright saw-cut 15 which is cut downward from the top of the body A in a diagonal direction from recess 1 forward and frontward to the front side of the shuttle, see Figs. 1, 2 and 4. The intersecting cuts 14, 15 I term the threading-slot, as in the operation of threading the shuttle the weaver draws the thread forward from the inlet-slot 4 across recess 1 into the part 15 and then downward around the shoulder 16 into the part 14, a backward pull on the thread carrying it along the saw-cut 14 into the eye 5 through its slot 13, as will be readily understood.

In order to prevent the thread from escaping from the eye after it has been directed thereinto by the threading-slot 14, 15 I have provided a novel and effective thread-controller, preferably made of rather thin plate metal, and seated in a socket 17, Fig. 4, in the shuttle-body at the outer end of the eye. The thread-controller, shown separately in Figs. 5 and 6, comprises a flat, elongated body or shank 18, and a substantially circular and enlarged forward end or head 19 centrally apertured at 20, the head being split to form a downturned and curved beak 21 terminating in a tip 22 turned toward the shank, and a forwardly extended heel 23 laterally offset from the beak at one side thereof, see Fig. 6, to leave a clearance 24 between the adjacent faces of the heel and beak, such clearance serving as a thread-inlet into the aperture 20. As shown in Figs. 2 and 5 the upper edge of the heel is raised above the tip of the beak, the heel thus overlapping the tip and the adjacent part of the beak, said upper edge being extended forward and downward curved at 25 beyond the downturned outer edge 26 of the beak, said crossed edges presenting a substantially V-shaped mouth or entrance turned toward the part 14 of the threading-slot. Referring to Fig. 2 it will be seen that the edge 26 crosses the saw-cut 14 and the adjacent portion of the beak extends below it, while the tip 22 is turned away from the saw-cut, so that when the thread leaves the latter it is carried downward around the edge 26 of the beak and up off its tip, while at the same time it travels up over the edge 25 of the heel, passing through the clearance 24 into the delivery-eye 5 and the aperture 20 at its outer end. After the thread is shed off the tip of the beak and is fully threaded into the delivery-eye it cannot escape therefrom, for the upper edge of the heel supports and maintains the thread elevated above the tip as it draws



through the eye 5 and aperture 20 to be delivered, and so long as the thread cannot pass under the tip it cannot escape. The point of the heel engages the shuttle-wood below the bottom of the saw-cut or slot 14, thereby obviating any chance of the thread being caught or pinched, and the downturned edge 26 of the beak depresses the thread away from the top of said slot. A slight prong 27 on the forward edge of the beak pushes into the shuttle-wood at the forward end of the socket 17, to firmly position the beak, while the thread-controller as a whole is securely held seated in the socket by suitable screws 28.

In Fig. 1 the shuttle is shown as completely threaded, the filling thread *t* being shown as lying in the passage 3 and thread-slot 9, and traversing the delivery-eye 5 and the aperture 20 of the controller at the outer end thereof.

The preparation of the shuttle for the thread-controller and guide and retainer is effected by appropriate saw-cuts and borings, making such preparation simple and cheap, while the combined guide and retainer, see Fig. 7, can be produced very quickly. The thread-controller, Fig. 5, is conveniently stamped or died out from plate metal, and the heel and beak are offset and caused to overlap by suitable dies.

By the construction herein described the threading operation is greatly facilitated, practically only two movements of the hand being required to insert the thread into the delivery-eye, the means for acting upon and controlling the thread cooperating therewith promptly and positively.

Changes or modifications in various details of construction may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the claims annexed hereto.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A loom shuttle having a bobbin-receiving recess and a slotted delivery-eye, and a threading slot to direct the thread from the said recess into the slotted eye, combined with a flat and down curved metal beak seated in the shuttle-body at the outer end of the eye and crossing the slot thereof at its junction with the threading slot, the beak having a tip turned backward from the slot, the beak having at its outer side a laterally offset heel extended forward beyond and above the tip, to maintain the thread above the tip when it draws through the eye to be delivered, the thread passing from the threading slot directly into the eye under the tip of the beak and between the adjacent faces of the beak and heel.

2. A loom shuttle having a bobbin-receiving recess and a slotted delivery-eye, and a

threading slot to direct the thread from the said recess into the slotted eye, the shuttle-body having a socket in its front wall at the outer end of the eye, combined with a thread-controller seated in the socket and having a flat beak and an overlapping, laterally separated heel, said beak being curved forward and downward and crossing the slot of the eye at its outer end and having its tip turned away from the threading slot, the upper edge of the heel crossing the beak at its outer side above the tip to form a support for the thread above the tip of the beak as the thread is delivered through the eye.

3. A loom shuttle having a bobbin-receiving recess and a slotted delivery-eye, and a threading slot to direct the thread from the said recess into the slotted eye, the shuttle body having a socket at the outer end of the eye, combined with a thread-controller made of plate metal and seated in the socket and having a beak and an overlapping, laterally separated heel, said beak being curved forward and downward and crossing the slot of the eye at its outer end and having its tip turned away from the threading slot, the upper edge of the heel crossing the beak at its outer side above the tip to form a support for the thread as it is delivered through the eye, the outer edge of the beak crossing the threading slot and leaving a clearance between such edge and the shuttle-body adjacent the slot, to permit the ready passage of the thread from the slot around and under the outer edge of the beak directly into the delivery-eye, the upper edge of the heel at its forward extremity engaging the shuttle-body at a point below the bottom of the threading slot.

4. A loom shuttle having a bobbin-receiving recess and a slotted side delivery-eye, and a threading slot intersecting the eye, to direct the thread thereto from said recess, combined with a thread-controller consisting of a flat plate having an elongated body fixedly seated in the side of the shuttle-body and provided with an enlarged, substantially circular, slitted head at the outer end of the eye, the slitted head presenting a downcurved and rearwardly turned beak and a frontwardly extended heel overlapping the tip of the beak and laterally separated therefrom, the substantially straight upper edge of the heel rising above the tip of the beak to support the thread after it has passed through the head of the thread-controller into the eye and extending forward beyond the outer edge of the beak.

5. A hand-threading shuttle having a bobbin-recess and a side delivery-eye, a longitudinal, tubular thread-passage intermediate said recess and eye, an open inlet-slot in the shuttle-body leading into the upper part of said passage from the top of the shuttle-body



and downwardly inclined toward the eye side of the body, and an upright thread guide intersecting and extended into the passage and having a downturned retaining hook the point of which is below and back of the center of the passage and at a distance below the lower end of the inlet-slot, the thread being drawn down through the inlet-slot into the thread-passage over the hook and underneath its point and then upward beneath the hook in the threading operation, whereby the thread is overhung and retained by the downturned hook in the thread-passage as it draws around the guide and passes to the delivery eye.

6. A hand-threading shuttle having a bobbin-recess and a side delivery-eye, a tubular, longitudinal thread-passage intermediate said recess and eye, an open inlet-slot in the shuttle-body leading into the upper part of such passage from the top of the body and inclined downwardly and toward the eye side of the body, and an upright guide-post extended into and across said thread-passage and provided with a diagonal thread-slot open only at its lower end to receive the thread, said slot being inclined from its closed upper end downwardly and away from the eye side of the shuttle-body, the open end of the thread-slot being below and at a distance from the junction of the inlet-slot with the tubular thread-passage.

7. A hand-threading shuttle having a bobbin-recess, and a side delivery-eye, a tubular, longitudinal thread-passage intermediate said recess and eye, an open inlet-slot in the shuttle-body leading into the upper part of such passage from the top of the body and inclined downwardly and toward the eye side of the body, and an upright, rotatably adjustable thread-guide extended into and crossing the thread-passage at the forward end thereof, said guide having a diagonally located, straight thread-slot open only at its lower end and inclined downwardly and oppositely to the inlet-slot, adjustment of the guide varying the tension on the thread as it draws through the thread-slot on its way to the delivery-eye, the closed upper end of

the said slot retaining the thread therein at or near the upper part of the tubular thread-passage.

8. A hand-threading shuttle having a longitudinal, tubular thread-passage leading from the bobbin-recess, a frontwardly and downwardly inclined inlet-slot in the shuttle-body leading into said passage, and an upright, manually rotatable post in the forward end of the passage, having a thread-slot closed at its upper end and inclined oppositely to the inlet-slot and open at its lower end, the closed upper end of the thread-slot being located centrally near the top of said passage and its open lower end being at one side of the passage and at a distance below the intersection of the bottom of the inlet-slot with the thread-passage, the post serving as a guide around which the thread draws while the slotted portion of said post retains the thread in the passage and regulates the tension thereon according to the angular position of the post.

9. A hand-threading shuttle having a bobbin-recess and an open side-eye, a thread-passage intermediate the bobbin-recess and the inner end of the eye, said passage having an inlet at its top, an upright, angularly-adjustable thread-guide extended into the passage and provided with an upwardly extended diagonal slot closed at its upper end and open at its lower end at the surface of the guide, to receive the thread and prevent its escape from the passage, and a thread-controller at the outer end of the eye, comprising a curved beak and a heel offset from and overlapping the tip of the beak, the upper edge of the heel being higher than the tip of the beak, to support the thread above said tip and thereby prevent escape of the thread from the eye.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HERBERT L. LITCHFIELD.

Witnesses:

WILLIAM P. PLIMPTON,  
SAMUEL S. SILVA.