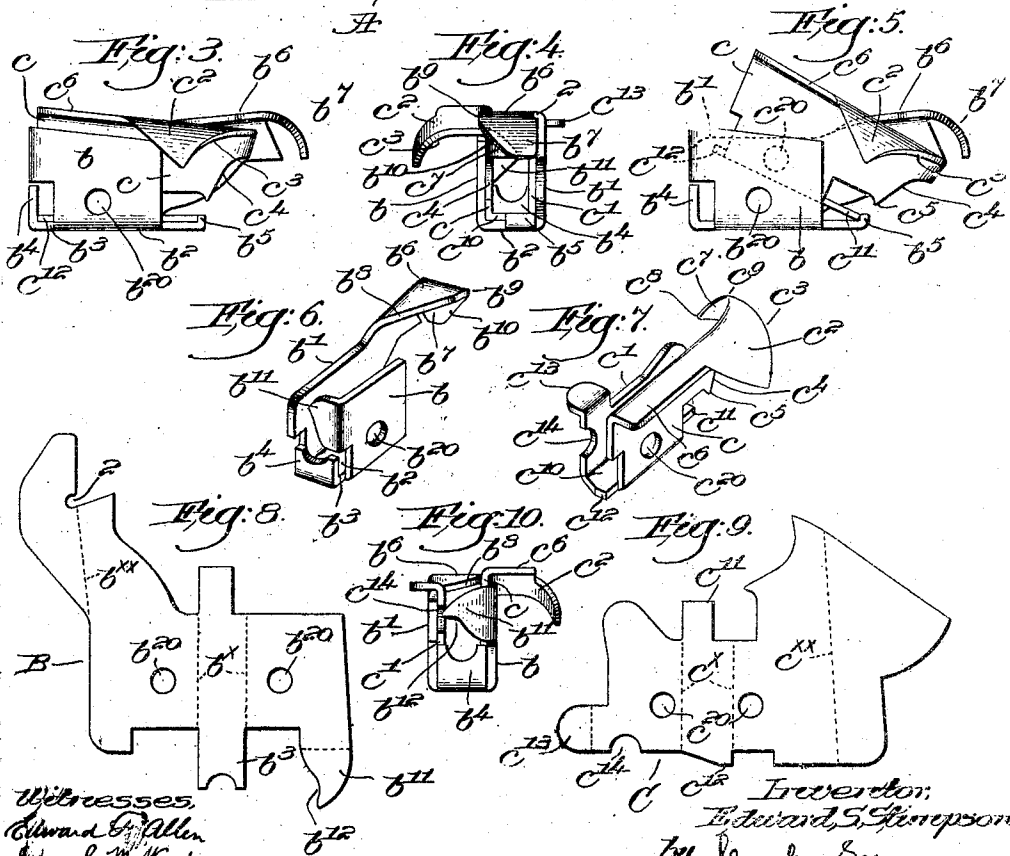


553,729.

Fig. 1 is a detailed cross-sectional view of a mechanical device, possibly a pump or engine component. It shows a central shaft or piston rod passing through a housing. The housing has a flared, bell-shaped end on the right. Various parts are labeled with letters and numbers: $\mathcal{A}^1$ and $\mathcal{A}^2$ point to the main body and the flared end respectively. $\mathcal{M}$ is labeled near the central shaft. Other labels include $b^1, b^2, b^3, b^4, b^5, b^6, b^7, b^8, b^9, b^{10}, b^{11}, b^{12}, b^{13}, b^{14}, b^{15}, b^{16}, b^{17}, b^{18}, b^{19}, b^{20}, b^{21}, b^{22}, b^{23}, b^{24}, b^{25}, b^{26}, b^{27}, b^{28}, b^{29}, b^{30}, b^{31}, b^{32}, b^{33}, b^{34}, b^{35}, b^{36}, b^{37}, b^{38}, b^{39}, b^{40}, b^{41}, b^{42}, b^{43}, b^{44}, b^{45}, b^{46}, b^{47}, b^{48}, b^{49}, b^{50}, b^{51}, b^{52}, b^{53}, b^{54}, b^{55}, b^{56}, b^{57}, b^{58}, b^{59}, b^{60}, b^{61}, b^{62}, b^{63}, b^{64}, b^{65}, b^{66}, b^{67}, b^{68}, b^{69}, b^{70}, b^{71}, b^{72}, b^{73}, b^{74}, b^{75}, b^{76}, b^{77}, b^{78}, b^{79}, b^{80}, b^{81}, b^{82}, b^{83}, b^{84}, b^{85}, b^{86}, b^{87}, b^{88}, b^{89}, b^{90}, b^{91}, b^{92}, b^{93}, b^{94}, b^{95}, b^{96}, b^{97}, b^{98}, b^{99}, b^{100}, b^{101}, b^{102}, b^{103}, b^{104}, b^{105}, b^{106}, b^{107}, b^{108}, b^{109}, b^{110}, b^{111}, b^{112}, b^{113}, b^{114}, b^{115}, b^{116}, b^{117}, b^{118}, b^{119}, b^{120}, b^{121}, b^{122}, 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Witnesses,
Edward F. Allen
Joseph M. Ward.

C^{ts} Inverdon,
Edward Simpson,
by Leasby Gregory.

UNITED STATES PATENT OFFICE.

EDWARD S. STIMPSON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

AUTOMATICALLY-THREADING SHUTTLE.

933,729.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed February 20, 1909. Serial No. 479,071

To all whom it may concern:

Be it known that I, EDWARD S. STIMPSON, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Automatically-Threading Shuttles, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to shuttles designed to be used in looms of the type wherein provision is made to supply automatically the working shuttle with fresh filling from time to time without interfering with the running of the loom. Such shuttles are provided with means to assume control automatically of the incoming filling thread and to direct it to the delivery-eye of the shuttle in order that the thread may be delivered properly and freely as the shuttle is picked.

The threading device is arranged to assume control of the new thread and direct it into a thread passage on the first shot of the shuttle following replenishment, and on the return shot the thread should be directed automatically into the delivery-eye, completing the threading. Some shuttles are provided also with means whereby the thread can be delivered freely even if the threading is not completed on the second shot, as above referred to, so that while the thread is delivered from a part of the shuttle independent of the delivery-eye the thread will not be broken, nor will the proper operation of the loom be affected.

My present invention relates to the latter type of shuttle, and comprehends certain improvements in various features as well as the construction of the threading device from plate or sheet-metal, formed by the use of suitable dies, so that the threading device is ready for use as soon as it is mounted in the shuttle, obviating various hand operations requiring skill and judgment on the part of the operator, and enabling the threading devices to be indefinitely and exactly reproduced.

I make the threading device in two parts and when such parts are assembled they are held in the proper relation one to the other to form a complete threading device, and such relationship is maintained by the single fastening member which retains the device as a whole in the shuttle.

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

Figure 1 is a top plan view of the eye end of a shuttle containing my present invention; Fig. 2 is a front elevation thereof; Fig. 3 is a front elevation of the threading device, with its separable members assembled but removed from the shuttle; Fig. 4 is a right-hand end elevation of the threading device shown in Fig. 3; Fig. 5 is a front elevation shows one of the members of the threading device uptilted to more clearly show the manner in which the members are assembled; Figs. 6 and 7 are perspective views of the outer and inner members of the threading device, the former member carrying the shield and the latter member carrying the beak which in practice is curved rearwardly and turned away from the nearer tip of the shuttle; Figs. 8 and 9 are plan views of the blanks from which are formed the outer and inner members, respectively, of the threading device; Fig. 10 is a left-hand end elevation of the assembled threading device, viewing Fig. 3.

As shown in Fig. 1 the shuttle A has a bobbin-receiving opening A' and an open delivery-eye a provided with a narrow entrance slot a', as usual in shuttles of this type, and the shuttle-wood is suitably cut out to receive the threading device and to present a downwardly inclined directing channel A² leading away from the tip of the shuttle to the thread passage, the front wall a² of the channel extending to the entrance slot a' and having its top inclined downwardly from the top of the shuttle to the upper end of the entrance slot. A metallic liner c, tubular in form, is inserted in the eye and is provided with a longitudinal slot e² which registers with the entrance slot a' as shown in Fig. 2, the general shape of the liner being shown in dotted lines Fig. 1. This liner is made the subject of claims in another application Serial No. 457,254 filed by me the 12th day of October, 1908, and is not claimed herein. In such application I have also shown the threading device made of plate or sheet-metal, in two parts, and herein I have shown another form of threading device, the peculiar and novel features of which will be fully described hereinafter. The blanks B and C, Figs. 8 and 9, cut or

stamped out of suitable plate metal, such as sheet steel, form when completed the two parts or members of the threading device, the blank B being bent on the dotted lines b^* to present upturned and parallel front and rear walls b , b' , Fig. 6, the flat bottom b^2 connecting the walls having at one end an extension b^3 , turned up as shown in Figs. 3, 5, 6 and 10, at b^4 and notched, while at the opposite end of the bottom is a tongue slightly upturned at its extremity, as at b^5 , to form a stop, for a purpose to be described. When the members are assembled the parts b^4 and b^5 position the inner member in the outer member, which latter is made from the blank B, in my present invention. Said blank is bent laterally along the line b^{**} , Fig. 8, at the forward end of wall b' , and such bent over portion is shaped to present a shield b^6 downcurved at its forward end at b^7 , and as shown in Figs. 2, 3 and 5 the upper face of the shield is upwardly inclined from the top of the wall b' toward the tip of the shuttle. The forward end of the wall b' extends well along under the shield to provide a firm and rigid support therefor, the notch 2 assisting in the shaping of the shield by the forming dies.

Viewing Figs. 3 and 6 it will be seen that the upturned end b^4 of the extension b^3 is separated from the adjacent upright edges of the front and rear walls, providing the inner end of a holder for the insertion of a pad p of felt, flannel, or other friction producing material, as shown in Fig. 1, over which the thread draws from the bobbin when the shuttle is threaded.

As best shown in Fig. 1 the edge b^8 of the shield extends in a diagonal direction frontward from the wall b' and toward the shuttle-tip, and then forward at b^9 to the beginning of the downcurved part b^7 , thence diagonally toward the rear wall of the shuttle, as at b^{10} . The end of the wall b nearest the bobbin-receiving opening A' is prolonged at b^{11} and bent laterally toward and nearly to the rear wall b' , the prolongation b^{11} being shaped to present a tapered guard convex on its upper edge, and concaved or slightly hooked at its lower edge, as at b^{12} , Figs. 6 and 10, the point or nose of the guard being turned forward, as shown in Fig. 1. This guard not only serves as a means to direct the thread into and then to retain it in the thread passage at the inner end thereof, both before and after the shuttle has been completely threaded, but it also serves as a leader for the thread if threading is not completed on the second shot after filling replenishment, as will be explained.

The member so far described is in practice, the outer of the two members of the threading device, and its walls b and b' fit snugly in the recess in the shuttle-wood made for the purpose. I will now describe the

blank C from which is made the other member of the threading device, its structure presenting the parts complementary to those of the member already described and necessary to the effective control of the thread during the operation of threading the shuttle.

Referring to Fig. 9 the blank C is bent along the lines c^* to present parallel and upturned front and rear walls c , c' , Fig. 7, the former being the higher of the two, and the wall c is bent laterally and outward along the line c^{**} , to form the substantially triangular head c^2 curved over to lie upon the shuttle-body adjacent the entrance slot a' , the forward edge c^3 of the head assisting in directing the thread into such slot as it draws around and slides down the horn c^4 formed by the inclined forward edge of the front wall c . The wall is cut out to provide a heel c^5 at the lower end of the horn and form a clearance which accommodates the inner end of the liner e for the delivery-eye of the shuttle. The heel as usual serves to retain the thread in the eye after it has been drawn under the heel, and the bent over part c^6 at the top of the wall c forms a prolongation of the head c^2 and seats in a recess a' in the top of the shuttle, Fig. 1. I have shaped the blank C to provide for a beak c^7 at the upper end of the horn and forming the forward termination of the head c^2 and the horn, the beak being bent and extended rearwardly over the thread passage, formed by the parallel walls c , c' . The point c^8 and major portion of the beak are turned away from the shuttle-tip, as shown, and its upper edge is inclined from the apex c^9 to the point of the beak. Said beak tapers in the direction of its length, as will be apparent, and its forward face is inclined with respect to the longitudinal axis of the shuttle and also with respect to the shuttle-tip, so that during the threading operation the thread will slip over the beak readily and off its point into the thread passage. The beak will also readily shed a loop of thread if thrown forward upon it.

When the two members of the threading device are assembled the shield b^6 extends frontward and overhangs the beak, as clearly shown in Fig. 1, the front edge b^9 crossing above the beak at quite a distance frontward beyond the apex c^9 of the beak, for a purpose to be referred to. Opposite holes b^{20} are drilled or punched in the walls b , b' , and similar holes c^{20} are made in the walls c , c' , so located that when the two members of the threading devices are assembled a single fastening or retaining bolt M, Figs. 1 and 2, can be passed through the two sets of holes and the shuttle-wood, retaining the threading device securely in the shuttle and locking its members fixedly together. The bottom c^{10} of the thread passage has at

its forward end a toe c^{11} , and at its opposite end it is beveled off to leave a slight projection c^{12} , while a laterally bent ear c^{13} on the top of the wall c' fits into a recessed part of the shuttle-wood. Herein I have shown the upright end of the wall c' nearest the bobbin-opening A' as notched, at c^{14} , for a purpose to be described.

The two members of the threading device, made as described, have now to be assembled, and to effect this the inner member is tipped up and the beak on its front wall is passed under the shield on the rear wall of the outer member, the toe c^{11} bringing up against the upturned stop b^5 as shown in Fig. 5. With the parts in the relative position therein illustrated the inner member is swung down about the stop b^5 as a fulcrum, (the walls c and c' fitting snugly and easily between the walls b and b' of the outer member) until the bottom c^{10} of the thread passage rests flat upon the bottom b^2 of the outer member, as in Fig. 3. At this time the projection c^{12} wipes down into place against the adjacent face of the notched upright part b^4 of the extension b^3 , so that the two members of the threading device are definitely fixed in proper relative position, and at such time the holes c^{20} will register with the holes b^{20} , after which the assembled members are put into the shuttle and locked therein and together by the single bolt M , the friction pad p being forced into place between the bolt M and the upturned part b^4 , and held laterally by the walls c , c' , thus providing a relatively large friction surface at the bottom and inner end of the thread passage. By locating the projection c^{12} at the front side of the bottom c^{10} of the thread passage it clears the guard b^{11} when the members are assembled as described, and by offsetting the toe c^{11} and the tongue having the stop b^5 , as best shown in Fig. 1, the inner or rearmost end of the liner e is cleared when the threading device is positioned in the shuttle. As the inner member is swung down from the position shown in Fig. 5 to that shown in Fig. 3 the point of the guard b^{11} enters the notch c^{14} , as shown in Fig. 10, the extremity of the point projecting beyond the plane of the front face of the wall c' .

Referring to Fig. 2 it will be seen that all parts of the threading device are entirely below the top of the shuttle-body, particularly at the back of the shuttle, so that there can not be any interference with the warp as the shuttle passes through the shed.

In both Figs. 2 and 3 it will be seen that the frontwardly extended parts c^8 and c^2 of the wall c slope downward toward the tip of the shuttle at the eye-end thereof, to assist the direction of the thread over and beneath the beak on the first shot of the shuttle following filling replenishment. Supposing

the fresh supply of filling to have been inserted in the shuttle, as the latter is picked the thread draws over the convex upper edge of the guard b^{11} and around and beneath its point, passing into the notch c^{14} and out of it into the thread passage, the concave lower edge b^{12} of the guard then extending over the thread. Once under the guard the thread is trapped in the inlet or inner end of the thread passage and cannot be thrown or whirled out of it, for the face of the rear wall c' is beyond the tip or point of the finger, as clearly shown in Fig. 10, and as the guard is very near the tip of the bobbin the whirling of the thread is restricted within proper limits. Ordinarily the thread slides along the prolongation c^9 and over the head c^2 and is drawn beneath the shield b^8 , the down-curved and rearwardly inclined or diagonal edge b^{10} of the shield acting to positively depress the thread and draw it down across the top of the beak c^7 , off its point and then beneath the beak, this being effected on the first shot of the shuttle and the thread is then in the thread passage and lies in the channel A^2 , or across its front wall a^2 . Now the return or second shot of the shuttle is made, and the thread as it draws around the horn c^4 and under the edge c^3 of the head c^2 is directed under the heel c^5 and into the entrance slot a' , passing thence through the slot e^2 of the liner e into such liner and into the delivery-eye a , so that threading of the shuttle is completed. If the thread should not be drawn beneath the beak on the first shot it will still be in deliverable condition without danger of breakage, for the thread will draw off around the base of the guard b^{11} , the latter now serving as a leader for the thread. This capability of the guard is clearly shown in Fig. 1, for the finger is curved rearward and forward toward the beak, making a kind of hook for the thread to draw around. After the thread has been directed beneath the beak on the first shot and the shuttle starts back on the second shot the forward edge b^{10} and front edge b^9 of the shield act to direct the thread against the edge c^3 of the head at a point so far away from the apex c^9 of the beak, toward the front of the shuttle, that the thread, even if very kinky or fine, cannot curl or twist in such a manner as to get behind the apex and thence off the beak. Hence after the thread has once been drawn under the beak it cannot approach the apex of the beak near enough to slide back behind such apex and fall off or be shed from the beak.

Referring to Fig. 1 it will be seen that the diagonal edge b^8 of the shield and the guard b^{11} are a long distance apart, the intervening space communicating directly with the thread passage, so that if a loop of thread should be thrown forward from the bobbin

it would rarely strike the shield, but would drop across the guard into the open space, and would be taken up without any possibility of catching on the beak. Should the loop
5 be long enough to strike the shield the edge thereof would direct the loop forward away from the beak and out of danger.

By making the shield and the guard on one member of the threading device, and the
10 head and rearwardly and backwardly turned beak on the other member the construction of said members is materially facilitated, and the assemblage thereof is easily effected in the manner described. Herein that side
15 or wall of the shuttle nearest the front of the loom is regarded as the front of the shuttle, and the rear of the shuttle is its opposite side, when the shuttle is on the lay, and the term "forward" means toward the tip of
20 the shuttle at the thread-delivering end thereof.

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

25 1. An automatically-threading shuttle having an open delivery eye and a two-part sheet-metal threading device, each member thereof having upturned front and rear walls one pair of which is adapted to enter snugly
30 between the other pair and form a thread passage, one of the front walls terminating in a horn having a rearwardly turned beak and the other front wall having a fixed guard thereon overhanging the thread pas-
35 sage at its inner end, one of the rear walls having a frontwardly extended shield overlapping the beak and the other rear wall having a notch to receive the point of the guard, and means to properly position one
40 of said members with relation to the other when said members are assembled.

2. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, each member
45 thereof having upturned front and rear walls one pair of which is adapted to enter snugly between the other pair and form a thread passage, one of the front walls terminating in a horn having a rearwardly turned beak
50 and the other front wall having a fixed guard thereon overhanging the thread passage at its inner end, terminating in a point and turned forward toward the beak, the point extending rearward beyond the plane
55 of the face of the rear wall of the thread passage, to admit the filling-thread thereinto while preventing its withdrawal therefrom, and a frontwardly extended shield on the other rear wall, overlapping the beak,
60 the guard serving as a guide for delivery of the thread independently of the delivery-eye.

3. An automatically-threading shuttle having an open delivery-eye and a two-part
65 sheet-metal threading device, each member

thereof having upturned front and rear walls one pair of which is adapted to be inserted between the other pair and swung down into operative position between them, to form a
70 thread passage, a horn on the front wall of one member, having a rearwardly turned beak, and a frontwardly extended shield on the rear wall of the other member overlapping the beak, the shield being downcurved at its forward end beyond the beak, to posi-
75 tively depress and direct the thread of filling down under the beak, a guard on one of the front walls extended across the thread passage at its inner end and turned forward toward the beak, and means to cooperate
80 with the point of the guard and prevent escape of the thread from the thread passage after it has been directed thereinto by the guard.

4. An automatically-threading shuttle hav-
85 ing an open delivery-eye and a two-part sheet-metal threading device, the inner member thereof having upturned walls constituting a thread passage, the front wall termi-
90 nating in a horn having a rearwardly turned beak and the rear wall having a notch in its inner end, the other outer member having upturned walls to receive between them the walls of the inner member, the rear wall
95 of the outer member having a frontwardly extended shield overlapping the beak, a guard on the front wall at its inner end, overhanging the thread passage and turned forward with its point extended into the notch, and a stop on the outer member to
100 cooperate with a toe on the inner member and form a fulcrum about which the inner member can be swung into and out of operative position with relation to the outer member.
105

5. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, the inner member thereof having upturned walls consti-
110 tuting a thread passage, the front wall terminating in a horn having a rearwardly turned beak and the rear wall having a notch in its inner end, the other outer member having upturned walls to receive between them the walls of the inner member,
115 the rear wall of the outer member having a frontwardly extended shield overlapping the beak, a guard on the front wall at its inner end, overhanging the thread passage at its inner end and with its point extended into the notch beyond the plane of the front
120 face of the wall, and means to position said members relatively to each other when assembled.

6. An automatically-threading shuttle
125 having an open delivery-eye and a two-part sheet-metal threading device, the inner member thereof having upturned walls constituting a thread passage, the front wall terminating in a horn having a rearwardly
130

turned beak and the rear wall having a notch in its inner end, the other outer member having upturned walls to receive between them the walls of the inner member, the rear wall of the outer member having a frontwardly extended shield overlapping the beak, a guard on the front wall at its inner end, overhanging the thread passage at its inner end and with its point extended into the notch beyond the plane of the front face of the wall, the outer member having upturned portions at the opposite ends of its bottom, and projections on the inner member, at its opposite ends, to enter between the said upturned portions on the outer member and position the two members when assembled.

7. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, one member thereof having upturned walls forming a thread passage, the front wall terminating in a horn having a rearwardly turned beak, and a forwardly extended toe on the bottom of the thread passage, the other member also having upturned walls the rear one having a frontwardly extended shield overlapping the beak and the front wall having a fixed guard at its inner end overhanging the thread passage and having its point extended rearward beyond the plane of the face of the rear wall of the first-named member, to assist in directing the filling-thread into and to prevent its escape from the thread passage, and a stop on the second-named member to engage the toe on the first-named member and position it when swung downward to place the upturned walls thereof between the walls of the first-named member.

8. An automatically-threading shuttle having an open delivery-eye and a threading device composed of two members made of sheet metal and angularly movable into operative position one within the other, the inner member having a thread passage and a horn terminating in a beak, a shield and a fixed guard on the outer member, the shield overlapping the beak and being downcurved over it and having its front edge extended beyond the apex of the beak, the guard being located at the inner end of and overhanging the thread passage, and means on the outer member to cooperate with the inner member and permit angular movement thereof into operative position, while preventing relative longitudinal movement of said members when operatively positioned.

9. An automatically-threading shuttle having an open delivery-eye and a two-part, separable threading device made of pressed sheet-metal, each member having parallel upturned walls, the walls of the inner member being movable into operative position between the walls of the outer member and forming a thread passage, a rearwardly ex-

tended thread-directing guard on the outer front wall overhanging the thread passage at its inner end, a horn on the inner front wall having a beak turned rearwardly over the passage at its outer end, said wall being extended frontward to form a head and a prolongation thereof toward the inner end of the thread passage, said head and its prolongation being downwardly inclined from the inner to the outer end of the thread passage to facilitate direction of the thread thereover, a frontwardly extended shield on the outer rear wall overlapping the beak, an extension on the outer member, upturned at the inner end of the thread passage, to form the inner end of a holder for a friction pad, and an upturned stop on the outer member at the outer end of the thread passage, to cooperate with the inner member when the latter is moved into operative position.

10. An automatically-threading shuttle having an open delivery eye and a threading device composed of two members made of sheet-metal and angularly movable into operative position one within the other, the inner member having a thread passage provided with a pocket in its rear wall, a horn on said member terminating in a beak, a downcurved shield on the outer member overlapping the beak, a fixed guard on the outer member overhanging the inner end of the thread passage and extending into the pocket, a toe on the inner member, and a stop on the outer member to cooperate with the toe and position the inner members when angularly moved into place within the outer member.

11. An automatically-threading shuttle having an open delivery-eye and a threading device composed of two members made of sheet-metal and movable into operative position one within the other, the inner member having a thread passage and an overhanging head provided with a horn terminating in a beak, the top of the head being inclined downward from the inner end of the thread passage to the beak, a frontwardly extended shield on the outer member overlapping the beak and inclined upwardly to a point above the beak and downcurved forwardly beyond such point, and a guard on one of the members overhanging the inner end of the thread passage, to direct the thread thereinto and prevent its escape therefrom, said guard being turned forward toward the beak to serve as a leader for the thread and deliver it freely independently of the delivery-eye.

12. An automatically-threading shuttle having an open delivery-eye, and a sheet-metal threading device having opposite, upturned walls forming a thread passage, the bottom of the same being upturned at its inner end, said threading device having a horn terminating in a beak rearwardly extended over the outer end of the thread passage, a frontwardly extended shield overlap-

ping the beak and downcurved toward the shuttle-tip, to positively engage and depress the thread below the beak, a retaining bolt extended transversely through the shuttle-wood and passing through the walls of the thread passage just above the bottom thereof, and a friction pad fixedly held in the bottom of the thread passage between the upturned inner end thereof and the exposed portion of the retaining bolt and held from

transverse movement between the walls of the passage.

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

EDWARD S. STIMPSON.

Witnesses:

GEORGE E. CHANDLER,
E. D. OSGOOD.