

UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-THREADING SHUTTLE.

933,728.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed October 12, 1908. Serial No. 457,254.

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 characters on the drawing representing like parts.

This invention relates to shuttles adapted for use in looms wherein the working shuttle is provided automatically with a fresh supply of filling from time to time while the loom continues to run. Such shuttles are provided with means to assume control of the incoming filling thread when a replenishment of filling is effected and to direct such thread automatically to the delivery-eye of the shuttle, from which eye the thread thereafter is drawn as the shuttle is thrown or picked back and forth through the shed.

Ordinarily, in the numerous types of automatically-threading shuttles hereinbefore devised, the threading device on the shuttle assumes control of the new thread and directs it into a thread passage on the first shot of the shuttle following replenishment, and on the return shot the thread is directed automatically into the delivery-eye, the threading being thereby completed. If the control of the thread is not assumed on the first shot the thread will be broken on the return shot, and in some structures if the initial control is not carried on to a certain point the thread is broken on the second shot, requiring another operation of the replenishing mechanism.

Another form of threading device has been devised wherein, if threading is not completed on the second shot after replenishment, the thread may draw freely and uninterruptedly from a part of the threading device independently of the delivery-eye without affecting the proper operation of the loom, and the beak under which the thread passes is rearwardly curved and turned away from the nearer tip of the shuttle, to facilitate the threading operation and also to shed an occasional loop which is sometimes formed and thrown forward onto the beak. Such a structure forms the subject matter of the United State Patent No. 769914 granted to Northrop September 13, 1904, and my present invention is of the general

type disclosed in that patent and is an improvement thereon in certain features of construction to be pointed out hereinafter. My present invention also comprehends the construction of the threading device from sheet-metal, pressed or otherwise shaped up from blanks in such manner that each and every threading device will be a counterpart of all the others turned out by the same apparatus or mechanism.

At the present time the threading devices are almost universally made as castings, and while supposedly all of the threading devices of a given shape and structure are duplicates as a matter of fact there are sufficient differences, due to shrinkage or warping of castings, or to other causes, as to require careful testing and more or less "tuning up" and fitting of practically every casting of a lot before it will work as designed in the shuttle. This imposes an additional cost on the manufacture, involving time and the employment of skilled labor, and reduces the output correspondingly.

In my present invention the threading device is duplicated time after time by the forming mechanism, which is exact and positive in its operation, so that the devices require no subsequent hand labor in fitting and correcting faults arising in the course of manufacture.

In order to adapt sheet metal to the desired use while obtaining certain features in the completed structure I have devised certain novel details of construction and arrangement which will be described in detail hereinafter, the threading device being made in two parts and then assembled to form a unitary article.

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 removed from the shuttle, the separable members of said device being shown assembled and locked together; Fig. 4 is a similar view of the inner member of the threading device; Fig. 5 is a perspective view of said member; Fig. 6 is a perspective view of the other or outer member of the threading device; Figs. 7 and 8 are end elevations of the assembled threading device, looking at Fig. 3 from the right and left, respectively; Figs. 9 and 10 are plan views of the blanks from which the outer and inner members, re-

spectively, of the threading device are formed. Fig. 11 is a top plan view of the metallic bushing or liner for the eye of the shuttle, and which also serves as a guide for the thread as its direction is changed to pass through the eye; Fig. 12 is a perspective view of the liner, viewed from its inner end.

The shuttle A has the usual bobbin-receiving opening A' common to shuttles of this type, and an open delivery-eye a provided with an entrance slot a', Fig. 2, the shuttle wood being suitably recessed to receive the threading device and having a directing-channel A² inclining downwardly and away from the tip of the shuttle, the front wall a² of the channel continuing to the entrance slot a', the inclined or sloping bottom of the directing-channel being shown by dotted lines Fig. 2, the eye having a metallic liner to be referred to hereinafter.

As previously stated the threading device is made of sheet-metal, such for instance as steel, which can be readily died or stamped and then in suitable forming presses or dies is given the required shape and contour for effecting the functions required of the completed device.

The blanks B and C, Figs. 9 and 10, show the outline for the two parts or members of the threading device, in accordance with my present invention, the blank B being bent along the dotted lines b^x, Fig. 9, to form upturned and parallel front and rear walls b, b', Fig. 6, the bottom b² being extended at one end at b³ and notched at b⁴, the extension serving as a locking device, as will be described. The blank is bent laterally in the same direction at the tops of the walls, along the lines b^x, Fig. 9, the substantially triangular head b⁵ being thereby formed on the front wall, to lie upon the shuttle body adjacent the entrance slot a', the curved forward edge b⁶ of the head assisting in directing the thread into such slot as it draws around and slides down the horn b⁷ formed by the inclined forward edge of the wall b. At its lower end the horn is provided with a heel b^{7x}, which as shown by dotted lines Fig. 2 is positioned with relation to the eye a to cooperate therewith and retain the thread in the eye after it has been drawn under the heel.

The elongated, bent over portion b⁸ at the top of wall b and joining the head fits into a shallow recess in the top of the shuttle wood and assists in positioning the threading device.

So far as described the head, horn and heel are in their contour, arrangement and function similar to corresponding parts in the patent hereinbefore referred to. The blank B is so shaped, however, as to provide for a beak b⁹ at the upper end of the horn, said beak being bent and extended rearwardly over the thread passage, to be re-

ferred to, the point and major portion of the beak being turned away from the shuttle-tip, Fig. 1, and the under edge b¹⁰ of the beak is substantially horizontal Figs. 7 and 8, while its upper edge is inclined from the base of the beak to its tip, as shown, the part of the beak turned away from the tip of the shuttle starting at the point b^{9x}, which may be termed the apex of the beak. The beak tapers in the direction of its length, and its forward face is in a plane inclined with respect to the longitudinal axis of the shuttle and also with respect to the tip of the shuttle, so that the thread will slip easily over the beak and off its point during the threading operation, and the beak will also shed a loop if thrown forward thereupon, as in the patent referred to. The bent over portion of the blank at the top of the rear wall b' forms a transversely wide and longitudinally prolonged shield b¹¹ which is extended frontward and overlaps the beak, as shown, the front edge b¹² of the shield being convexed and crossing above the base of the beak, at quite a distance in front of the point b^{9x}, as very clearly shown in Fig. 1, the front edge b¹² of the shield being continued forward toward the shuttle-tip well beyond the edge b⁶ of the head. The shield is downcurved in the direction of its length over the beak, and at its forward extremity passes into a depression in the shuttle wood, the widest part of the shield being at the corner b^{12x} formed by the intersection of its edge b¹² with its forward edge b¹³, which latter is diagonal and also inclined downwardly from front to rear, passing down into the directing-channel A² and intersecting the plane of the under edge of the beak substantially at the median line of the thread passage, said edge b¹³ extending below the beak at its rear end, Figs. 7 and 8.

From Fig. 2 it will be seen that the major portion of the forward edge b¹³ of the shield is below the front wall a² of the channel A², for a purpose to be described.

So far I have described but one member of the threading device, and for convenience in its operative position in the shuttle, and now I will describe the other member of said device and its several features of construction.

By bending the blank C along the lines c^x two upturned, parallel walls c, c' are provided, which constitute a thread passage C^x through which the thread travels from the bobbin to the delivery-eye after the shuttle has been threaded a projecting part c³ at the top of the rear wall c' being inclined frontwardly and downwardly to assist in directing the incoming thread to the passage. The bottom c² of the passage is prolonged at c⁴, and at its forward end the front wall has a prolongation c⁵, the said wall having at its top at the other end a rearwardly extended

and slightly inclined guard c^6 overhanging the inner or entrance end of the thread passage. The forward edge of the guard is concaved and terminates in a finger c^7 turned toward the beak and closely approaching the rear wall c' , leaving between said wall and the guard a narrow entrance c^8 to the thread passage.

As shown in Fig. 4 the forward end of the wall c' is somewhat higher than the top of the prolongation c^5 , to pass under the shield when the two members are assembled and assist in positioning them.

The two parts or members, shown separately in Figs. 6 and 5 are assembled by sliding the member illustrated in Fig. 5 into the other member, the walls c , c' just fitting closely between the walls b , b' , the tip of the prolongation c^5 abutting against the concave side of the beak at its base and operatively positioning the two members. At such time the bottom portions c^2 , b^2 are superposed, Fig. 3, and the extension c^4 projects beyond the ends of the upright walls, as shown. The locking portion b^3 of the outer member is now upturned into final position, Fig. 3, and dotted lines Fig. 6, against the extension c^4 , thereby locking the members of the threading device together and at the same time forming a seat for a friction-pad F of flannel, felt or other suitable material. The notch b^4 allows for the wearing down of the pad by the constant passage of the thread and obviates contact of the thread with the metal of the extension b^3 .

The members, having been assembled as described, and in operative position relatively, Figs. 3, 7 and 8, are now inserted in the shuttle, the thread passage C^* being alined with the directing-channel A^2 and communicating therewith. A suitable retaining bolt D is extended transversely through the shuttle and passes through registering holes b^{20} and c^{20} in the upright walls of the members of the threading device, and the shuttle is ready for use.

In order to line the shuttle-eye and obviate the employment of wear-resisting pins often used, and also to furnish a convenient and effective guide for the thread as it turns in its path from the thread passage through the eye I have provided a metallic bushing or liner, preferably of hardened steel, which is inserted in the eye a and fixedly secured in place.

The liner is shown separately in Figs. 11 and 12, and comprises a tubular body e cut away at its inner end at e' at the forward side of a longitudinal entrance slot e^2 in the top of the liner, the body having an external transverse notch e^3 formed therein adjacent its inner end and intersecting the longer wall of the slot. The liner is driven into the eye a with a driving fit, the entrance slot e^2 being uppermost and registering with the

slot a' , to afford an inlet for the thread, and when in position the notch e^3 of the liner is entered by the upright edge b^{19} of the front wall of the outer member of the threading device, as shown in Fig. 1, see the dotted lines, thereby preventing any longitudinal movement of the liner. As the upright edge b^{19} fits squarely against the bottom of the notch e^3 the liner is held from any rotative movement, and the heel b^{1x} of the horn dips downward above the cut away portion e' of the liner, leaving an open unobstructed path for the thread as it is drawn down the horn, under the beak and thence into the slots a' , e^2 into the body of the liner. The inner end of the liner is rounded over to form a smooth, curved face over which the thread draws, doing away with the use of a guide-pin, as heretofore, and similarly the outer end is rounded over.

As to the threading operation, when the bobbin is inserted in the shuttle the filling thread leading therefrom is directed by the parts c^3 and c^6 down to the narrow inlet or entrance c^8 and thence into the thread passage, the thread being drawn under the guard c^6 and lying at first upon the top of the shield b^{11} , and the shuttle makes its first shot away from the replenishing side of the loom. As the shuttle moves away in a diagonal path, owing to the backward swing of the lay, the thread will generally be drawn across the convex front edge b^{12} of the shield and onto the top of the head b^5 , sliding rearwardly thereover onto the top of the beak and under the shield, the pull on the thread causing it to travel along over the apex b^{9x} of the beak and off its point, and at the same time the thread is positively engaged and depressed by the forward edge b^{13} of the shield and thereby forced to move downward and rearward under such forward edge b^{13} into and along the channel A^2 . As the thread is thus drawn along it is shed from the beak and immediately passes under it, extending through the thread passage C^* forward along the channel A^2 . After the shuttle completes its pick the filling thread laid is beaten in, the shed changes, and the shuttle is shot across on the return pick. The thread is now drawn out of the channel along the forward edge b^{13} of the shield past the apex b^{12x} and strikes the head b^5 at a point on the edge b^6 quite a distance in front of the bend or apex b^{9x} of the beak, the thread then being guided between the edge b^6 and the wall a^2 down into the slots a' , e^2 , the bight of the thread around the horn sliding down under the heel b^{1x} into the eye, the complete threading of the shuttle having been thus effected. Thereafter, if the thread should be thrown out of the eye and slot toward the shuttle-tip it will meet the front edge b^{12} of the shield and be thrown back onto the head b^5 so far in front of the turn

b^x of the beak that the bight of thread cannot be drawn around the beak to be shed therefrom and escape out of the threading passage, should the finger c' fail to hold it.

5 Referring to Fig. 1 it will be clear that the thread, after it has once passed under the beak, cannot approach the turn or apex b^x of the beak any closer than the apparent intersection of the edges b^{12} and b^6 , which is adjacent the forward curve of the beak, and this is true no matter how much the thread may kink or curl. So long as the thread cannot strike the forward curved edge of the beak at or rearwardly beyond 10 the turn or apex b^x it cannot pull off or be shed from the beak, and the construction herein described prevents such action, as has been explained. Should a long loop be 20 ordinarily be caught on the beak, for the shield would act to throw the loop onto the head b^5 toward the front of the shuttle at a distance from the apex of the beak, but if the bight of the loop should be thrown under 25 the shield and around the beak at its base the tightening of the thread will cause the beak to shed the loop without harm. I thus have provided such a thread controlling or threading device that the thread, when once 30 under the beak on the first pick or shot after replenishment, must enter the delivery-eye on the second or return pick and cannot be drawn over or shed from the beak, and this has not heretofore been possible to insure 35 with fine and kinky filling while still retaining the loop shedding structure of the beak.

It is particularly to be observed that when the thread is drawn under the shield on the first shot after replenishment the diagonal and inclined forward edge b^{13} of the shield acts to positively depress and at the same time force the thread rearward as it draws over the wall a^2 , and as the edge b^{13} intersects and extends below the plane of the 40 under edge of the beak the thread is thereby drawn down positively over and is shed off the upper edge of the beak. This positive control and movement of the thread downward and rearward to carry it beneath the 50 beak is altogether different from the sliding movement of the thread rearward over the head and the top of the beak, which is practically the action in shuttles of this general type as usually constructed. This construction practically insures the positioning 55 of the thread under the beak and in the thread passage and directing-channel on the first shot of the shuttle after replenishment, and as stated when so positioned the thread 60 on the return shot must of necessity be drawn frontward over the edge b^6 of the head and pass into the eye a . However, if the thread by kinking or twisting, or from any other cause, should only pass under the 65 guard c^6 on the first shot, lying upon the

shield or on the head b^5 , and not beneath the beak, the return shot will not cause breakage for the thread will then draw freely over the concaved forward edge of the guard, which then serves as a leader to deliver the 70 thread properly independently of the eye of the shuttle. The finger on the guard, extended forward toward the beak, assists in retaining the thread in the thread passage at the inner or entrance end thereof, as it 75 approaches very closely the rear wall of the thread passage, so that after the thread has been drawn down under the guard it is practically impossible for it to escape from the passage through the narrow inlet. 80

In referring to different parts of the shuttle and the threading device the front of the shuttle is regarded as that side or wall thereof nearest the front of the loom, and 85 the rear of the shuttle is the side toward the back of the loom, when the shuttle is on the lay, and by the term "forward" I mean toward the tip of the shuttle at the thread-delivering end thereof, these definitions being 90 given to avoid any ambiguity or uncertainty in the specification and claims.

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

1. An automatically-threading shuttle having an open delivery-eye, and a threading device provided with a thread passage, said device having a horn terminating in a beak rearwardly extended over the thread passage and having a substantially horizontal 100 lower edge, and a frontwardly-extended shield overlapping the beak and downcurved toward the shuttle-tip, the forward, diagonal edge of the shield being downwardly inclined from front to rear of the thread passage and crossing the plane of the under 105 edge of the beak and continuing below the same, to first positively engage and depress the filling thread and thereby draw it over and then downward beneath the beak, and said edge thereafter acting to guide the 110 thread frontward and to a point beyond the apex of the beak, thereby preventing the thread from pulling upward off the beak and out of the thread passage. 115

2. An automatically-threading shuttle having an open delivery-eye and a threading device provided with a thread passage, said device having a horn terminating in an elongated, tapered beak extended rearward 120 over the thread passage and turned away from the shuttle-tip, and a frontwardly extended shield overlapping the beak and downcurved toward the shuttle-tip, the shield being extended frontward beyond the apex of the beak and forward of the same, the diagonal forward edge of the shield being downwardly inclined from front to rear 125 of the thread passage and crossing the plane of the under edge of the beak substantially 130

at the median line of the passage and terminating below the beak, said forward and inclined edge acting to engage and positively depress the thread and carry it downward beneath the beak.

3. An automatically-threading shuttle having an open delivery-eye and a threading device provided with a thread passage, said device having a beak rearwardly extended across the thread passage and having a substantially horizontal under edge, and a frontwardly extended shield overlapping the beak and downcurved toward the tip of the shuttle, the forward diagonal edge of the shield being downwardly inclined from the front to the rear of the thread passage, and extending below the plane of the under edge of the beak, and beyond the tip thereof toward the rear of the passage, and the front edge of the shield projecting frontward beyond the apex of the beak, to prevent engagement of the thread with the beak behind or at its apex and consequent escape over the beak and out of the passage.

4. An automatically-threading shuttle having an open delivery-eye and a threading device provided with a thread passage, and an inclined horn to direct the filling thread from the passage to the delivery-eye, the horn having a heel at its lower end and at its upper end a head terminating in a beak directed away from the shuttle-tip and extended rearwardly over the thread passage, and a downcurved, frontwardly extended shield at the rear side of said passage to overlap the beak, the shield having its front edge longitudinally convex and crossing the beak at a distance from and in front of its apex, the forward edge of the shield being inclined and diagonal from front to rear of the shuttle to positively engage and depress the thread and carry it under the beak, the thread after passing under the beak being directed by the forward and front edges of the shield onto the head at a point at the base of the beak in front of its apex, to prevent the thread from passing behind the apex and thence off the beak.

5. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, one member thereof having upturned walls the front one terminating in a horn having a rearwardly turned beak and the rear one having a frontwardly extended shield overlapping the beak, the other member having upturned walls forming a thread passage and slidable into operative position between the walls of the first-named member, a lock on the latter to hold the members together, and a fixed guard on the front wall of the second-named member overhanging the thread passage, to assist in directing the filling-thread into and prevent its escape from the thread passage and serving also as a guide for delivery of

the thread independently of the delivery-eye.

6. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, one member thereof having upturned walls the front one terminating in a horn having a rearwardly turned beak and the rear one having a frontwardly extended shield overlapping the beak, the other member having upturned walls forming a thread passage and slidable into operative position between the walls of the first-named member, a lock on the latter to hold the members together, the front wall of the second-named member having a prolongation to abut against the base of the beak and form a positioning stop for the two members, and a guard on said front wall overhanging the thread passage at its inner end.

7. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, one member thereof having upturned walls the front one terminating in a horn having a rearwardly turned beak and the rear one having a frontwardly extended shield overlapping the beak, the other member having upturned walls forming a thread passage and slidable into operative position between the walls of the first-named member, a prolongation at the inner end of the first-named member adapted to be upturned against the inner end of the bottom of the thread passage, to form a lock holding the two members together, and a fixed guard on the front wall of the second-named member overhanging the inner end of the thread passage, and cooperating with the rear wall to provide a narrow inlet to said passage.

8. An automatically-threading shuttle having an open delivery-eye and a two-part, telescopically connected threading device made of pressed sheet-metal, each member having parallel, upturned side walls, the walls of the inner member fitting between the walls of the outer member and forming a thread passage, a rearwardly extended thread-directing guard on the inner front wall overhanging the thread passage, a horn on the outer front wall having a beak turned rearwardly over the passage at its outer end, a frontwardly extended shield on the outer rear wall overlapping the beak, and a locking projection on the outer member of the threading device, upturned at the inner end of the thread passage and forming thereat a pocket for a friction pad.

9. An automatically-threading shuttle having an open delivery-eye and a threading device composed of two members made of sheet metal and slid into position one within the other, the inner member having a thread passage and a fixed guard overhanging its inner end, means on the outer member to co-

operate with the inner member and lock it in operative position, a horn on the outer member terminating in a beak, and a shield on said member overlapping the beak, the shield being downcurved over the beak and having its forward edge below the under edge of the beak.

10. An automatically-threading shuttle having a side delivery-eye and a two-part sheet-metal threading device to direct the filling thread to the eye, one member having upturned parallel walls the front one terminating in a horn having a beak and the rear wall having a shield frontwardly extended and downcurved to overlap the beak, the second member having upturned parallel walls, the front wall having a prolongation to abut against the base of the beak and form a positioning stop, the forward end of the rear wall rising beneath the shield, the walls of the second-named member forming a thread passage and sliding into position between the walls of the first-named member, and a tongue on one member to engage the other member and lock them together.

11. An automatically-threading shuttle having a delivery-eye and a directing-channel inclining downwardly from the tip of the shuttle, and a threading device provided with a thread passage in substantial alignment with said channel, the threading device having a horn with a heel at its lower end and at its upper end provided with a beak extended rearwardly over the thread passage, and a frontwardly extended shield overlapping the beak and down curved toward the shuttle-tip, the forward, diagonal edge of the shield being downwardly inclined from front to rear to positively engage and depress the thread below the beak and having its major portion below the front wall of the directing-channel and continued below the plane of the under edge of the beak and beyond it to the rear of the thread passage.

12. An automatically-threading shuttle having an open delivery-eye and a threading device composed of two members made of sheet metal and slid into position one within the other, the inner member having a thread passage and a fixed guard overhanging its inner end, means on the outer member to cooperate with the inner member and lock it in operative position, a loop-shedding beak on the outer member, and a shield on said member overlapping the beak and having its front edge extended toward the front of the shuttle at a distance beyond the apex of the beak, the shield being longitudinally curved over the beak and having its forward edge inclined downward and rearward below the beak.

13. An automatically-threading shuttle having a side delivery-eye and an entrance slot therefor, a metallic liner inserted in the

eye and having a longitudinal slot registering with said entrance slot, a threading device to assume control automatically of the filling thread and direct it into the eye, and means on the threading device to interlock with and retain the liner in position by the threading device.

14. An automatically-threading shuttle having a delivery-eye and an entrance slot in its top, a metallic liner inserted in the eye and slotted to register with the entrance slot, the liner being cut away at its inner end adjacent the slot, and a threading device having a horn and a heel at its lower end above the cut-away part of the liner, the thread passing down the horn under the heel and passing into the liner by means of the slotted entrance and the cut away portion, the liner thereafter serving as a guide for the thread as it passes out of the shuttle.

15. An automatically-threading shuttle having a side delivery-eye and an entrance slot therefor, a metallic liner inserted in the eye and having a longitudinal slot registering with said entrance slot, said liner having an external notch at its inner end, and a threading device to assume control of and automatically direct the thread into the liner, said device engaging the notch in and preventing rotative or longitudinal movement of the liner in the delivery-eye.

16. An automatically-threading shuttle having a transverse eye and an entrance slot leading thereto, a metallic thread-guide and lining for said eye, inserted therein and having a slot registering with the lower end of the entrance slot, said guide and lining having a transverse notch, and a threading device to assume control of and direct the thread to the eye and having a part entering the notch, to retain the lining in the eye and also holding it against rotation.

17. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device provided with a horn having a rearwardly turned beak, and a frontwardly extended shield overlapping the beak, each member having upturned opposite walls, the walls of one member fitting into operative position between the walls of the other member and forming a thread passage, means to hold said members in cooperative relation, and a fixed guard on the front wall of one of said members overhanging the thread passage, to assist in directing the filling-thread into and preventing its escape from the thread passage and serving also as a guide for delivery of the thread independently of the delivery-eye.

18. In an automatically-threading shuttle, a delivery-eye, a rearwardly turned beak having its point turned away from the nearer tip of the shuttle, and a shield overlapping the beak and acting to depress the

thread below the same, and extended frontward to present a front edge substantially parallel to the front wall of the shuttle and beyond the apex of the beak, to guide the thread toward the delivery-eye, the front edge acting to prevent the thread, after it has passed under the beak, from being drawn backward over the beak behind the apex.

19. An automatically-threading shuttle having a delivery-eye and a threading device including a rearwardly extended loop-shedding beak, a horn below the beak, a shield overhanging the latter and acting to depress the thread below the beak and having its front edge crossing said beak at a distance in front of and also extended forward beyond the apex of the beak, such edge holding the thread toward the front of the shuttle after the thread has passed under the beak and preventing engagement of the thread with the forward edge of said beak near or to the rear of its apex, and a heel on the horn to prevent withdrawal of the thread after it has been drawn into the delivery-eye.

20. An automatically-threading shuttle having an open delivery-eye and a two-part sheet-metal threading device, each member having upturned, opposite and longitudinally extended walls, the walls of one member fitting into operative position between the walls of the other member and forming a thread passage, one of the front walls terminating in a horn having a rearwardly turned beak, and a frontwardly extended shield on a rear wall, overlapping the beak,

means to lock the two members in cooperative relation, and a fixed guard on the front wall of one of the members overhanging the inner end of the thread passage and cooperating with the rear wall of the thread passage to provide a narrow inlet therefor.

21. A thread controlling and directing device for automatically-threading shuttles, made of sheet-metal and comprising opposite walls to form a thread passage, a beak, and a shield having a forward diagonal edge, the beak extending across and having its point turned away from the outer end of the thread passage, the shield extending in the opposite direction over the passage and overlapping the beak, the front edge of the shield crossing the beak at a distance from and in front of the apex thereof, the forward diagonal edge of the shield being downwardly inclined from above the beak at one side of the thread passage toward the opposite side thereof beyond the point of and extending below the under edge of the beak, said diagonal edge acting, in the threading operation, to positively engage and depress the thread below the beak, and the front edge of the shield at such time preventing engagement of the thread with the beak at its apex or between the apex and the point of the beak.

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,
EDWARD DANA OSGOOD.