Nov. 9, 1926. 1,606,605

C. M. STONE ET AL

SHUTTLE THREADER

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FIG. 1.

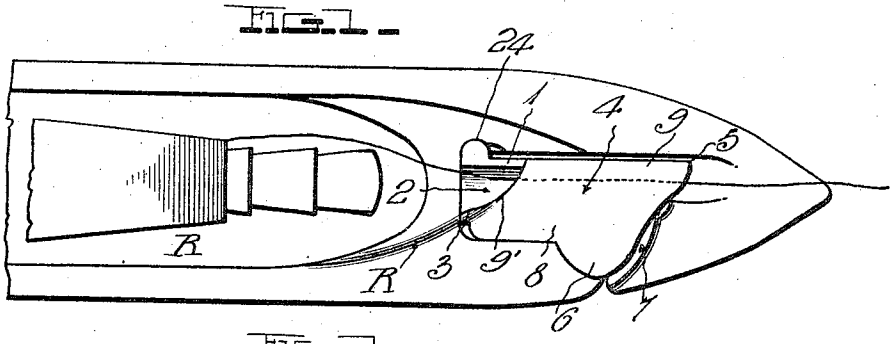


FIG. 2.

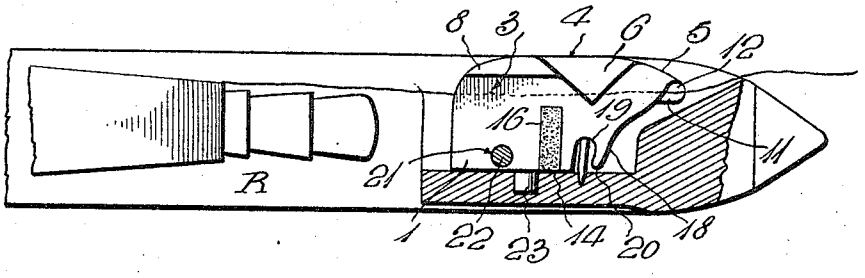


FIG. 3.

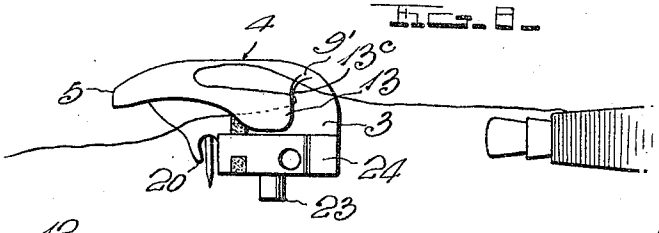


FIG. 4.

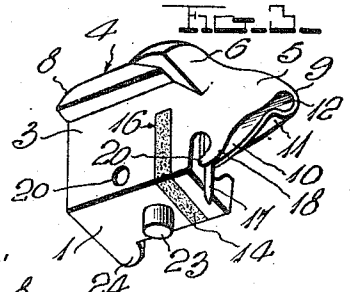


FIG. 5.

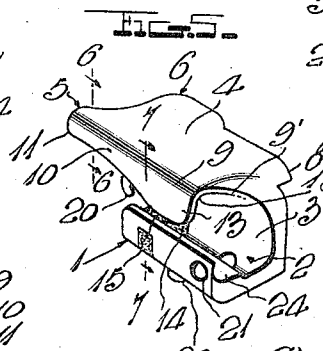


FIG. 6.

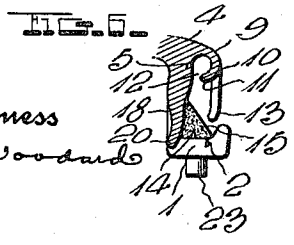
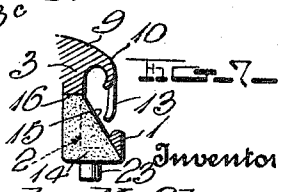


FIG. 7.



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Fig. 9.

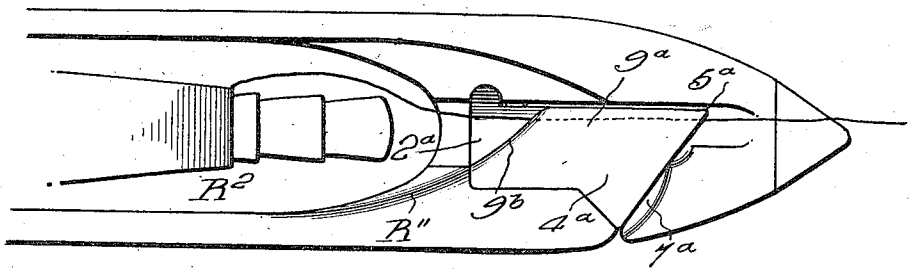


Fig. 10.

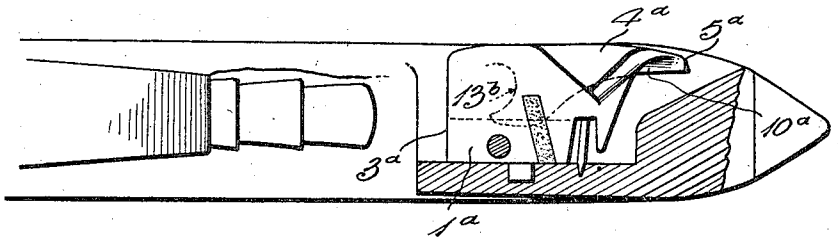


Fig. 11.

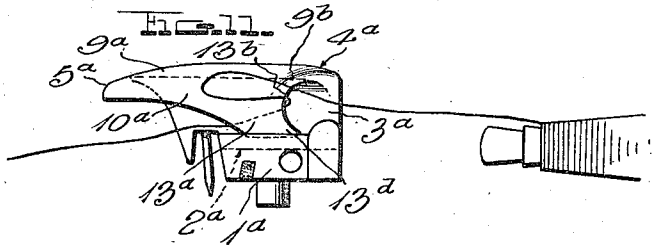


Fig. 13.

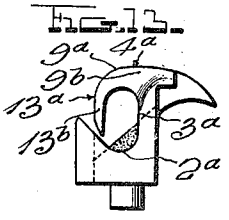


Fig. 12.

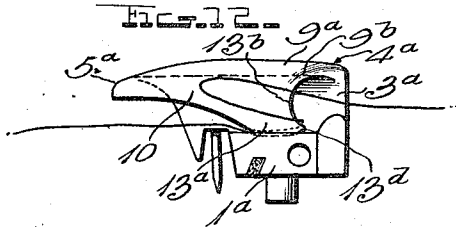


Fig. 15.

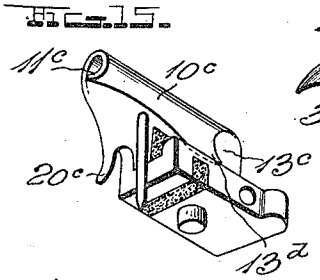
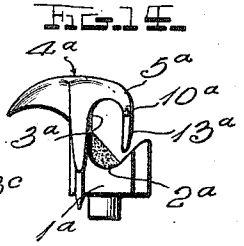


Fig. 14.



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UNITED STATES PATENT OFFICE.

CHARLES M. STONE AND WILLIAM H. SPENCER, OF LEWISTON, MAINE, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO TEXTILE MACHINE COMPANY, OF LEWISTON, MAINE, A CORPORATION.

SHUTTLE THREADER.

Application filed February 26, 1926. Serial No. 90,814.

This application is a continuation in part of our allowed U. S. application, Serial No. 50,749, filed August 17, 1925.

The invention relates to improvements in automatic shuttle threading devices of the general type disclosed for instance by the following U. S. Patents:—1,344,734, 1,505,190, 1,440,505, 1,478,458 and 1,405,452. Extensive experience with shuttle threaders of the general type of which the foregoing patents are illustrative, has shown that certain difficulties exist. The filling is liable to breakage when the bobbin is placed in the shuttle from the magazine, before such filling enters the threader; the filling or thread often rides upon the top of the shuttle or the threader instead of immediately entering the latter upon the first stroke of the shuttle across the lay; the filling very often does not enter the lateral outlet of the shuttle and engage the thread guiding means at such outlet, upon the next or return stroke of the shuttle; very often, when the filling or thread does enter this outlet, it slackens, moves again out of such outlet and becomes tangled on parts of the threader; and quite frequently, even if the filling or thread has properly entered the threader upon the first stroke of the shuttle, it will balloon out of the same and ride on top thereof, often becoming badly snarled. These difficulties means the expenditure of a great deal of time in properly watching and caring for the looms, as well as necessitating that the weaving operation be frequently stopped, with a consequent decrease of output.

It is the object of our invention to produce a number of distinct improvements in shuttle threaders of the type set forth, so as to effectively overcome such difficulties as those above enumerated, and in the actual operations of our invention in a number of mills, it is giving much better results than threaders as previously constructed.

In the accompanying drawing forming a part of this application, the preferred form of construction has been disclosed.

Figure 1 is a top plan view of one form of the shuttle threader applied to a shuttle.

Fig. 2 is a longitudinal sectional view through the shuttle showing a side elevation of the threader.

Figs. 3, 4 and 5 are perspective views of the threader.

Figs. 6 and 7 are detail vertical transverse sectional views, as indicated by the lines 6—6 and 7—7 of Fig. 5.

Fig. 8 is a side elevation showing the manner in which the filling is prevented from ballooning out of the threader.

Figs. 9 and 10 are views similar to Figs. 1 and 2 but showing a different form of construction.

Figs. 11 and 12 are side elevations showing the manner in which the filling is held against ballooning from the threader of Figs. 9 and 10.

Figs. 13 and 14 are respectively a rear elevation and a front elevation of the threader of Figs. 9 to 12.

Fig. 15 is a perspective view showing a combination of features disclosed in the preceding views.

The threader is in the nature of a block, the main parts of which are all preferably cast in a single piece, and the construction of Figs. 1 to 8 will first be described. This block includes a substantially rectangular base 1 having a thread-guiding channel 2 in its upper side and extending longitudinally of the latter. A vertical wall 3 rises from the base 1 at one side of the channel 2 and a head 4 is formed on the top of this wall. This head and the wall 3 jointly project forwardly from the base 1, to provide a nose 5, and said head is formed with the usual laterally projecting, thread-guiding lug 6 whose edge merges into the front edge of the nose 5 for guiding the thread into the usual lateral outlet throat 7 of the shuttle. Behind the projection 6 and projecting from the wall 3 in the same direction as the former, is a rib 8 which is also commonly used.

The head 4 includes a longitudinal flange 9 which projects laterally from the wall 3 in the opposite direction from the projection 6 and rib 8. This flange overhangs substantially the front half of the channel 2 and instead of being provided with front and rear downwardly projecting hooks to receive and guide the thread, we turn or curve the outer edge portion 10 of said flange downwardly throughout the length of the latter, and it will be observed that this downwardly turned portion 10 extends entirely to the nose 5. The rear end 13 of this portion 10 is forwardly spaced from the rear end of the base 1, and the rear

edge of the flange 9, extends obliquely, being preferably concaved, from the rear end of the wall 3 to said rear end 13 of the portion 10, said rear edge of the flange 9 being rounded or beveled at the upper side of the head 4, as indicated at 9'. The front end of the downward flange portion 10 is widened somewhat and is turned inwardly as at 11, toward the plane of the wall 3, forming almost a continuous thread guiding eye at this point, sufficient space 12 however remaining to permit the thread to enter and leave. The rear end 13 of the downturned flange part 10, is vertically widened as indicated and extends to the channel 2, for initially guiding the thread to said channel, and it will be observed that the head 4 is declined on its upper surface toward the flange portion 10, so that the thread will experience no difficulty in entering the space 14 between the flange portion 10 and one side of the shuttle recess, in which the block is secured. After the thread has once entered the channel 2, the whirling of said thread, as it is drawn off of the bobbin, causes it to immediately move upwardly into the eye formation 11, as the shuttle makes its first stroke across the lay, and obviously, this whirling continues after the thread has left the aforesaid formation 11 and has entered the lateral thread guide of the shuttle. Each time the thread whirls, it is thrown inwardly toward the wall 3, by the portion 13 of the downturned flange part 10, and we take advantage of this inward movement of the thread to effect desired tensioning of the latter, by locating a friction pad 14 across the channel 2, under said portion 13, said pad having an upper edge 15 which inclines to the wall 3, from the opposite side of the channel 2. Thus, each time the thread is thrown toward the wall by the portion 13, it must come in contact with the edge 15 of the friction pad 14, causing the desired tension to be placed on the thread.

For holding the pad 14 in place, we have provided the base 1 and wall 3 with a transverse kerf 16, in which said pad is held.

Any tendency of the thread to balloon out of the device is prevented by catching of said thread on the portion 13, as seen in Fig. 8.

Projecting downwardly from the flange 9, in front of the base 1, is the usual thread-guiding post 17 which penetrates the bottom of the shuttle recess in which the threader is mounted. In front of this post and disposed substantially in the plane of the wall 3, is a thread-guiding finger 18 which projects downwardly from the nose 5, said finger being preferably shorter than usual, in order to form more or less of an eye 19 behind it, although said finger may in some instances be longer than shown. The lower end 20 of this finger is laterally curved in the opposite direction from that in which the flange 9 projects from the wall 3, and this formation not only guides the thread into the lateral outlet of the shuttle more readily but prevents such thread from backing out of such outlet.

The improved threader may be mounted in any preferred manner in the usual shuttle recess R and the concaved flange end 9' is then coincident with the curved front portion R' of one of the recess walls, permitting the thread to readily slide from said wall to the threader. In the present showing, the base 1 is formed with a transverse opening 21 receiving the usual transverse pin 22, said base being provided with shuttle-engaging lugs 23 and 24, of conventional form. All portions of the shuttle adjacent the threader are of course suitably rounded to prevent catching and breaking of the thread, and there are no sharp angles or corners on the threader.

Those versed in the art, will observe that there is similarity between our invention and prior devices, but it will be clear also that certain distinct improvements have been made. Instead of having front and rear hooks at the front and rear ends of the flange 9, we downwardly turn the outer edge portion of this flange throughout the length of the latter, to co-operate with the thread channel 2 in forming what may well be termed a thread-guiding tunnel; we space the rear end 13 of the flange portion 10 forwardly from the rear end of wall 3 and obliquely cut the horizontal part of the flange 9 from said rear end of said wall to said rear end 13; we inwardly turn the front end 11 of the downturned flange portion, so as to form an effective thread guide at this point; we locate the friction pad 14 under the wide part 13 of the downturned flange portion 10 and provide this pad with an upper edge which inclines to the wall 3, so that each time the thread is whirled inwardly toward said wall by the portion 13, it must contact with said edge of the pad to produce the desired tension on the thread; and we laterally curve the lower end 20 of the guide finger 18 in the opposite direction from that in which the flange 9 projects from the wall 3, so as to more readily guide the thread into the lateral outlet of the shuttle, as well as preventing said thread from backing out of such outlet. These distinct changes over prior devices, produce a much more efficient threader, which is not open to certain disadvantages heretofore existing with other devices, and while it is preferred that all of these distinctions shall be incorporated in a single device, it will be obvious that a threader could be produced embodying certain of our improvements without others.

In Figs. 9 to 14, a construction is shown

which is rather similar to that previously described, but possesses certain different characteristics. In these views, 1^a designates a base having a thread guiding channel 2^a extending longitudinally in its upper side and provided with an upstanding wall 3^a at one side of said channel. Integral with the upper portion of this wall, is a head 4^a having a laterally projecting longitudinal flange 9^a which overlies the channel 2^a and extends forwardly from the wall 3^a, providing a nose 5^a. The outer edge portion of this flange is turned downwardly throughout its length to form a thread guide 10^a corresponding to the guide 10 but being devoid of any inturned portion such as 11 of the form of construction first described. The guide 10^a is rearwardly widened and has its widest portion 13^a disposed at its rear end and extending to the channel 2^a. The rear edge of the guide 10^a is forwardly spaced or offset from the rear edge of the wall 3^a, and said first named edge is inwardly bowed or concaved from its upper to its lower end as disclosed at 13^b. The rear edge 9^b of the lateral part of the flange 9^a, extends obliquely from the rear edge of the wall 3^a to the concaved edge 13^b, said edge 9^b being preferably bowed inwardly or concaved from end to end as shown on Fig. 9. Moreover, the head 4^a is beveled or rounded at its upper side, along the edge 9^b, and this beveled or rounded portion is coincident with the curvature R'' of one of the walls of the shuttle recess R^2. This relation permits the thread or filling to readily slide from the wall R'' onto the head 4^a and such thread or filling will readily slide along the beveled edge 9^b and snap under and behind the portion 13^a of the guide 10^a, upon the first stroke of the shuttle across the lay. Upon the next stroke, the thread enters the throat 7^a of the shuttle in the same manner as above described. As in the form of construction first explained, there is no danger of the thread becoming tangled and refusing to properly enter the threader and the shuttle throat, to effectively operate. Moreover, if the thread has any tendency to balloon out of the threader, it is caught by the concaved rear edge 13^b of the guide 10^a, as depicted in Figs. 11 and 12, so that it cannot become unthreaded or snarled. This same thread-holding function is performed by the portion 13 of the form of construction first described, but less effieiently than by the construction emboding the concaved edge 13^b. In either instance, inward or forward spacing of the rear edge of the guide 10 or 10^a from the rear edge of the wall 3 or 3^a, is considered an extremely important feature of the invention, not only in preventing ballooning of the thread out of the threader, but in insuring proper initial guiding of the thread into said threader.

Details of construction shown but not described in connection with Figs. 9 to 14, may be considered as duplicates or substantial duplicates of corresponding parts shown in the first group of figures.

Fig. 15 discloses a construction in which the thread guide 10^c is turned inwardly at the nose of the threader as indicated at 11^c and is provided with a concaved rear edge 13^c. Moreover, the thread-guiding finger 20^c is laterally curved. It will thus be seen that Fig. 15 embodies a combination of all features of novelty shown in Figs. 1 to 8 and in Figs. 9 to 14. Either this combined form of the invention or either of the others, is exceptionally efficient and in every way desirable.

Attention may further be directed to the fact that in the form of construction shown in Figs. 1 to 8, the formation 13^c between the lateral and down-turned portions of the flange 9, at the rear edge of this flange, constitutes a concaved formation upon which the thread catches as disclosed in Fig. 8 to prevent it from ballooning out of the threader. Hence, this formation has much the same function as the concaved edge 13^b, shown in the form of construction illustrated in Figs. 9 to 14. This explanation is given to make it clear that the idea of concaving a portion of the rear edge of the flange which projects laterally and turns downwardly from the wall 3—3^a is generic to both forms of construction so far mentioned, and even in the absence of specific description, it will be seen that this idea also exists in Fig. 15. This idea of concaving a portion of the rear end of the flange, is very important and is one of the principal reasons why the present invention effectively attains the end which prior devices have failed to attain.

Still further attention may be directed to the fact that in the forms of construction shown in Figs. 9 to 15, a rearward projection 13^d is provided at the lower portion of the thread guide 13^a, and it will be seen that the concaved edge 13^b forms a rearwardly declined upper edge for this projection, or more accurately speaking, it is the lower portion of the edge 13^b which forms the rearwardly declined upper edge for the projection 13^d. This rearward projection or an equivalent projection could be formed somewhat differently than here in disclosed, but would even then catch the thread to prevent ballooning thereof from the threader, but on account of its rearwardly declined upper edge, would permit free downward sliding of the thread when the initial threading operation takes place.

We claim:—

1. A shuttle threading block comprising a base having a longitudinal thread guiding channel in its upper side and an upstanding

longitudinal wall at one side of said channel, a longitudinal flange joined to said wall and projecting laterally therefrom over said channel, said flange extending from the rear end of the wall to a point in advance of the front end of said wall and at its front end providing a nose, the free edge portion of said flange being turned downwardly throughout the length of said flange and having its free edge unbroken throughout its length to form an uninterrupted thread guide, said downwardly turned flange portion being increased gradually in vertical width at its rear end portion and having the latter extending to said channel.

2. A shuttle threading block comprising a base having a longitudinal thread guiding channel in its upper side and an upstanding longitudinal wall at one side of said channel, a longitudinal flange joined to said wall and projecting laterally therefrom over said channel, said flange extending from the rear end of the wall to a point in advance of the front end of said wall and at its front end providing a nose, the free edge portion of said flange being turned downwardly throughout the length of said flange and having its free edge unbroken throughout its length to form an uninterrupted thread guide, said downwardly turned flange portion being increased gradually in vertical width at its rear end portion and having the latter extending to said channel, the rear edge of said downwardly turned flange portion being forwardly spaced from the rear end of said wall, the rear edge of the lateral part of said flange advancing obliquely and unbrokenly from said rear end of said wall to said rear edge of said downwardly turned flange portion.

3. A shuttle threading block comprising a base having a longitudinal thread guiding channel in its upper side and an upstanding longitudinal wall at one side of said channel, a longitudinal flange joined to said wall and projecting laterally therefrom over said channel, said flange extending from the rear end of the wall to a point in advance of the front end of said wall and at its front end providing a nose, the free edge portion of said flange being turned downwardly throughout the length of said flange and having its free edge unbroken throughout its length to form an uninterrupted thread guide, said downwardly turned flange portion being increased in width at its rear end portion and having the latter extending to said channel, said widened rear end of said downwardly turned flange portion having a concaved or inwardly bowed rear edge to prevent the thread from ballooning out of the space between the thread guide and wall.

4. A shuttle threading block comprising a base having a longitudinal thread guiding channel in its upper side and an upstanding longitudinal wall at one side of said channel, a longitudinal flange joined to said wall and projecting laterally therefrom over said channel, said flange extending from the rear end of the wall to a point in advance of the front end of said wall and at its front end providing a nose, the free edge portion of said flange being downwardly turned throughout the length of said flange and having its free edge unbroken throughout its length to form an uninterrupted thread guide, said downwardly turned flange portion being increased in width at its rear end portion and having the latter extending to said channel, the rear edge of said downwardly turned flange portion being forwardly spaced from the rear end of said wall, the rear edge of said guide being concaved between its upper and lower ends to prevent the thread from ballooning out of the space between said guide and said wall, the rear edge of the lateral part of said flange advancing obliquely and unbrokenly from said rear end of said wall to said concaved rear edge of said downwardly turned flange portion.

5. In a shuttle threader, a member for disposition at one side of the thread path, a lateral flange projecting from said member to overhang said path, and a thread guide projecting downwardly from said flange, the rear edge of said guide being concaved between its upper and lower ends to prevent ballooning of the thread from the space between said guide and said member.

6. In a shuttle threader, a member for disposition at one side of the thread path, a lateral flange projecting from said member to overhang said path, and a thread guide projecting downwardly from said flange, the rear edge of said guide being concaved between its upper and lower ends to prevent ballooning of the thread from the space between said guide and said member, said concaved rear edge being forwardly spaced from the rear end of said member, the rear edge of said flange advancing obliquely and unbrokenly to said concaved edge from said member.

7. A shuttle threading block comprising a base having a longitudinal thread channel in its upper side and an upstanding longitudinal wall at one side of said channel, a head joined to the top of said wall and with the latter projecting beyond the front end of said base to provide a nose, said head having a longitudinal flange which projects laterally therefrom, overhangs said channel and extends to the end of said nose, the free edge portion of said flange being curved downwardly throughout its length and being turned inwardly toward the plane of said wall at said nose, the rear end of said downwardly curved flange portion be-

ing of greater vertical width than the remainder of said portion and extending to said channel of the base to guide the thread into the channel, a thread-guiding post projecting downwardly from said flange in front of said base, a guide finger projecting downwardly from said nose in front of said wall and said post, the lower end of said finger being curved laterally in the direction opposite that in which said flange projects, and a friction pad extending across said channel under the relatively wide rear end of said downwardly turned flange portion, the upper edge of said pad inclining to said wall.

8. In a shuttle threading block having a base provided with a longitudinal channel, an upstanding wall at one side of said channel and a thread guide extending from the wall, overhanging the channel and turned downwardly to the latter; a friction pad between the ends of and extending across the channel under the downwardly turned portion of said guide, said pad having an upper edge inclining to said wall.

9. A shuttle threading block comprising a base having a longitudinal thread channel in its upper side and an upstanding longitudinal wall at one side of said channel, a head joined to the top of said wall and with the latter projecting beyond the front end of said base to provide a nose, said head having a longitudinal flange which projects laterally therefrom, overhangs said channel and extends to the end of said nose, the free edge portion of said flange being curved downwardly throughout its length and being turned inwardly toward the plane of said wall at said nose, the rear end of said downwardly curved flange portion being of greater vertical width than the remainder of said portion and extending to said channel of the base to guide the thread into the channel, a thread guiding post projecting downwardly from said flange in front of said base, and a guide finger projecting downwardly from said nose in front of said wall and said post, the lower end of said finger being curved laterally in the direction opposite that in which said flange projects.

10. A shuttle threading block comprising a base having a longitudinal thread channel in its upper side and an upstanding longitudinal wall at one side of said channel, a head joined to the top of said wall and with the latter projecting beyond the front end of said base to provide a nose, said head having a longitudinal flange which projects laterally therefrom, overhangs said channel and extends to the end of said nose, the free edge portion of said flange being curved downwardly throughout its length and being turned inwardly toward the plane of said wall at said nose, the rear end of said downwardly turned flange portion being of greater vertical width than the remainder of said portion and extending to said channel of the base to guide the thread into the channel, a thread guiding post projecting downwardly from said flange in front of said base, and a guide finger projecting downwardly from said nose in front of said wall and said post.

11. A shuttle threading block comprising a base having a longitudinal thread guiding channel in its upper side and an upstanding longitudinal wall at one side of said channel, a longitudinal flange joined to said wall and projecting laterally therefrom over said channel, said flange extending from the rear end of the wall to a point in advance of the front end of said wall and at its front end providing a nose, the free edge portion of said flange being downwardly turned throughout its length and having its entire lower edge unbroken, the front end of said downwardly turned flange portion being turned inwardly toward the plane of said wall at said nose, providing a thread guide, while the remainder of said downturned flange portion projects only in a downward direction.

12. In a shuttle threader, a member for disposition at one side of the thread path, a lateral flange projecting from said member to overhang said path, and a thread guide projecting downwardly from said flange, the rear edge of said guide being forwardly spaced from the rear edge of said member, the rear edge of said lateral flange advancing obliquely and unbrokenly from said member to said rear edge of said guide.

13. In a shuttle threader, a member for disposition at one side of the thread path, and a lateral flange projecting from said member over said path and having a downturned thread guiding portion substantially in a vertical plane and spaced from said member, a portion of the rear edge of said flange being concaved to catch the thread and prevent ballooning thereof from the threader.

14. In a shuttle threader, a member for disposition at one side of the thread path, a lateral flange projecting from said member to overhang said path, and a thread guide substantially in a vertical plane and projecting downwardly from said flange, the rear edge of said guide being provided at its lower portion with a rearward projection to catch the thread and prevent ballooning thereof from the threader, the upper edge of said rearward projection being rearwardly declined to permit free downward sliding of the thread therefrom when the initial threading operation takes place.

15. A structure as specified in claim 13; the rear edge of said downturned flange portion being forwardly spaced from the rear edge of said member, the laterally projecting

portion of said flange having its rear edge advanced unbrokenly and obliquely from said rear edge of said member to said rear edge of said downturned flange portion.

16. A structure as specified in claim 14; the rear edge of said guide being forwardly spaced from the rear end of said member, the rear edge of said lateral flange advancing unbrokenly and obliquely to said rear edge of the guide.

In testimony whereof we have hereunto affixed our signatures.

CHARLES M. STONE.
WILLIAM H. SPENCER.