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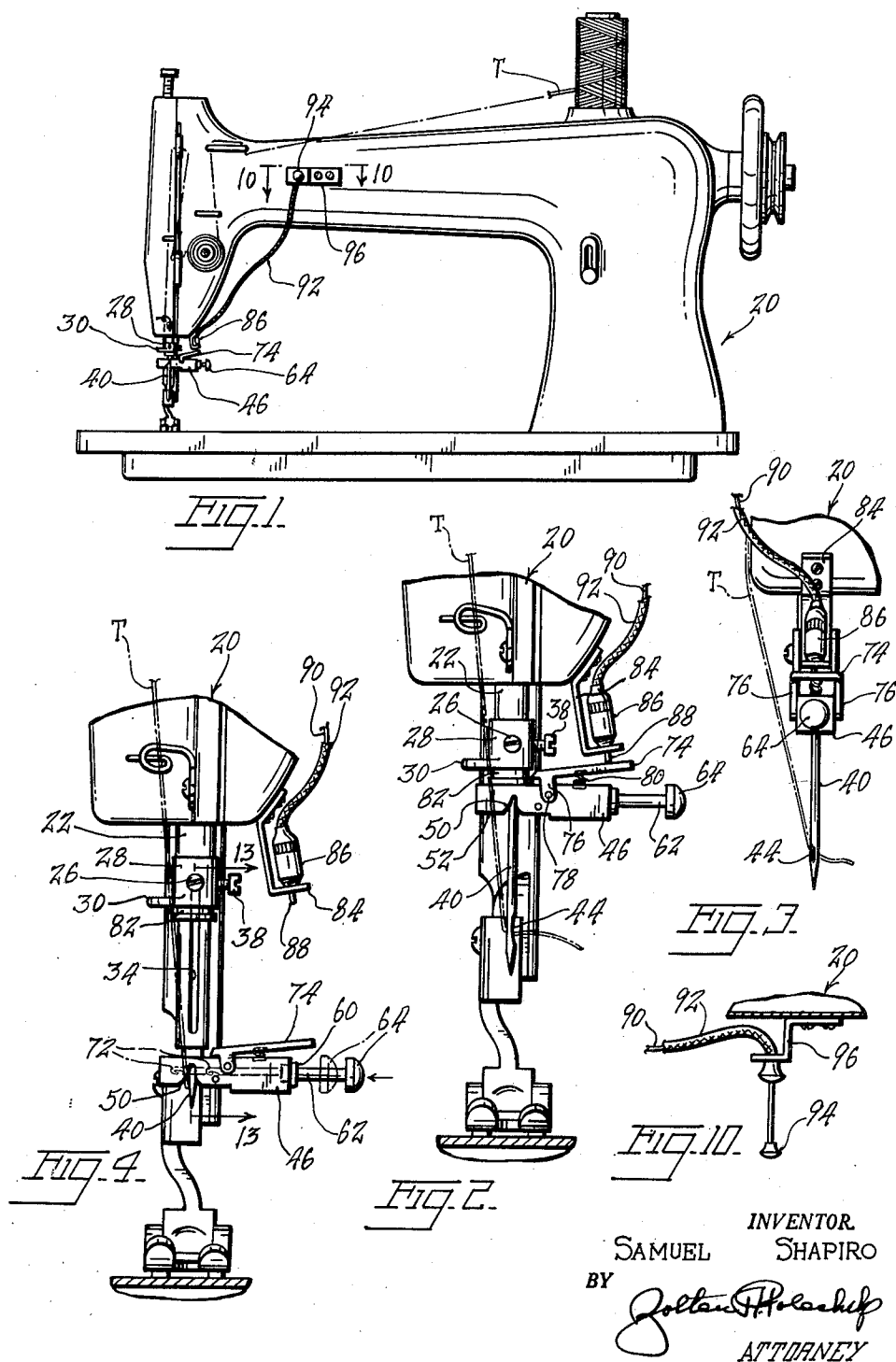
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AUTOMATIC NEEDLE THREADER FOR SEWING MACHINES

Filed Dec. 15, 1954

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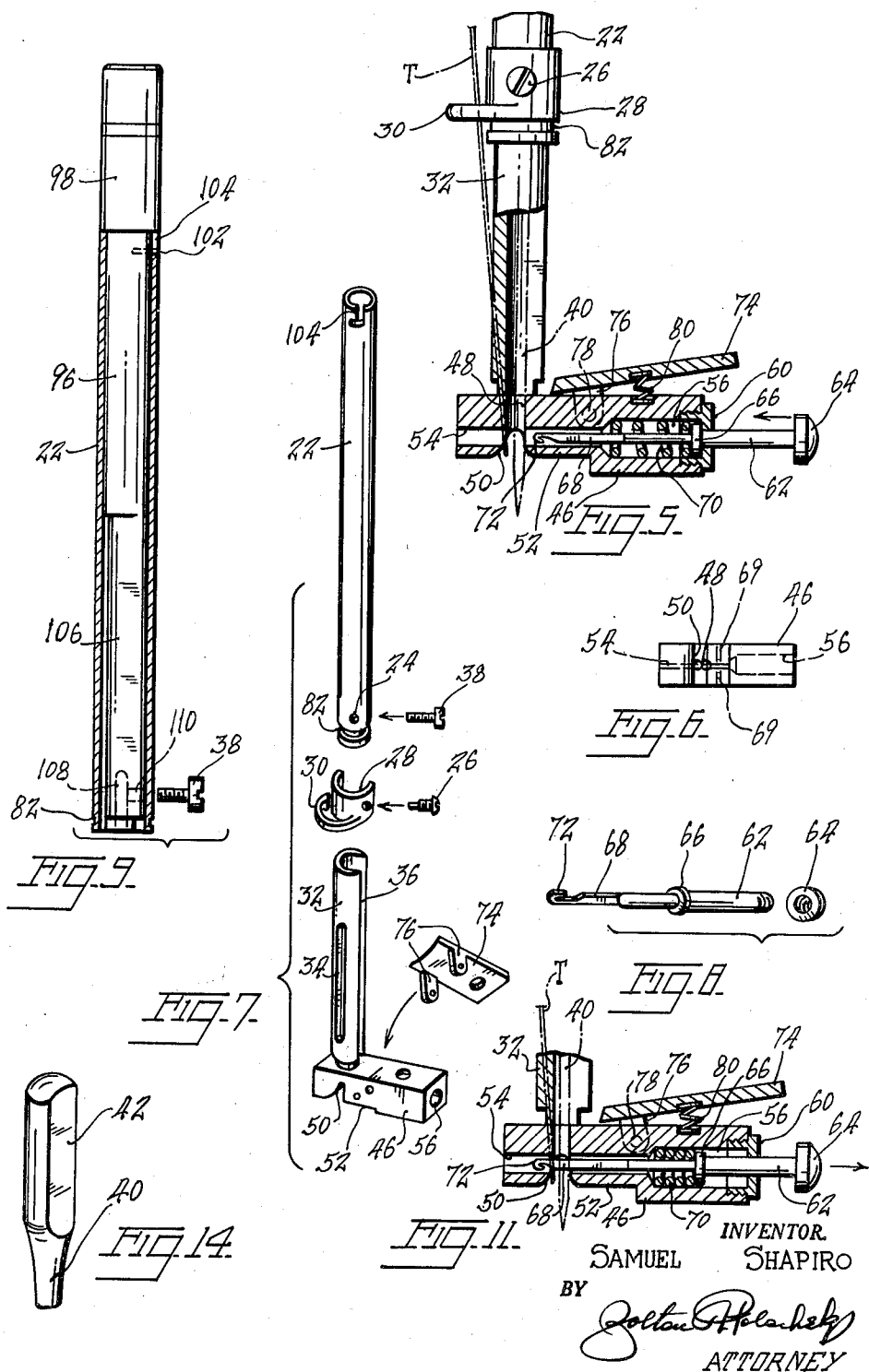
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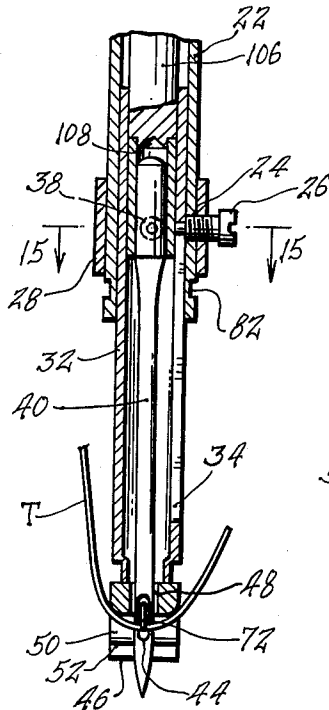


FIG. 13

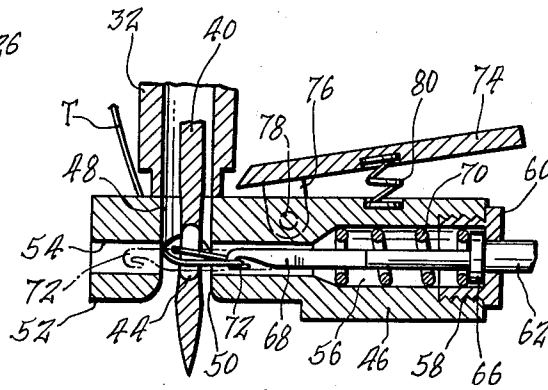


FIG. 12

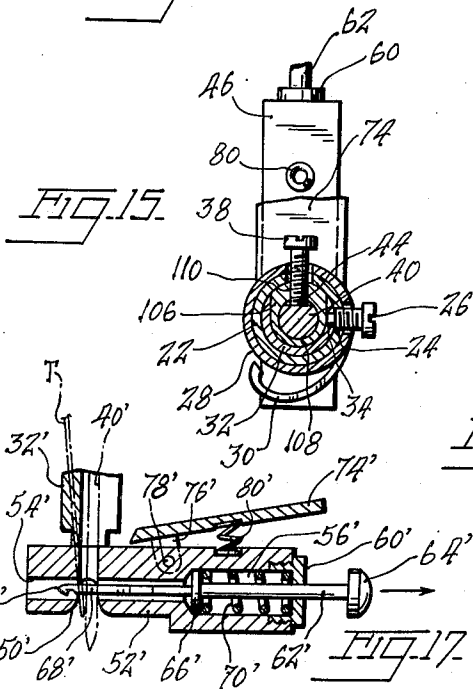
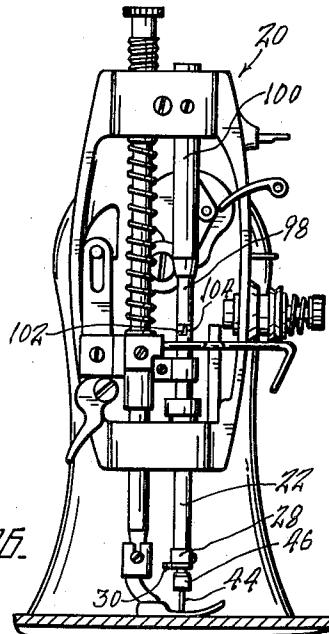


FIG. 15

FIG. 16



INVENTOR.

SAMUEL SHAPIRO

BY

John H. Holchick
ATTORNEY

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AUTOMATIC NEEDLE THREADER FOR SEWING MACHINES

Samuel Shapiro, Metuchen, N. J.

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6 Claims. (Cl. 112—225)

This invention relates to a needle threading attachment for a sewing machine, and more particularly, has reference to an improved attachment of the type stated, which is normally disposed in an out-of-the-way position in which it will not interfere with normal sewing operations, but which is readily shiftable longitudinally of the needle into registration with the needle eye, to facilitate the threading of the needle.

One important object of the present invention is to provide an attachment of the type referred to which will be a self-contained assembly adapted to telescopically receive the needle post, whereby said assembly can be assembled with a minimum expense, and can be mounted upon the needle post with ease and with minimum interference to normal sewing operations.

Another object is to so design the device as to normally latch the threading means in an elevated, out-of-the-way location, while permitting release of the latch by a remotely operated means.

Still another object is to improve upon the threading means that extends through the eye of the needle, in such a way as to cause the thread to be properly aligned with said threading means with maximum ease, and to cause, further, the threading means itself to be properly aligned with the eye of the needle, whereby to cause the thread to be extended through the eye merely by a single reciprocating movement of the threading means.

Still another object is to provide a needle threading attachment for sewing machines which can be manufactured at a relatively low cost, as an attachment for machines already in use.

Still another object is to provide a needle threading attachment as stated which will be swift and sure in operation, rugged in construction, and compact in form.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a front elevational view of a sewing machine equipped with a threading attachment formed in accordance with the present invention.

Fig. 2 is an enlarged front elevational view of the needle and of the attachment.

Fig. 3 is an elevational view of the needle and attachment as seen from the right of Fig. 2.

Fig. 4 is a view similar to Fig. 2 in which the threading attachment has been lowered for threading of the needle.

Fig. 5 is a still further enlarged, fragmentary view partly in side elevation and partly in longitudinal section of the needle and threading attachment in the Fig. 4 position.

Fig. 6 is a bottom plan view of the plunger support block of the attachment, per se.

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Fig. 7 is an exploded perspective view of the removable, self-contained threading assembly.

Fig. 8 is an exploded perspective view of the plunger per se.

Fig. 9 is a side elevational view of the needle post or assembly support bar of the sewing machine, the threading attachment support tube being telescopically related thereto and being shown in longitudinal section.

Fig. 10 is a detail, enlarged section on line 10—10 of Fig. 1 showing the remote control latch release means.

Fig. 11 is an enlarged, sectional view of the threading plunger and support block, with the plunger inserted through the eye of the needle during an intermediate step of the threading operation.

Fig. 12 is a view similar to Fig. 11, still further enlarged, with the plunger retracted to pull the thread through the eye of the needle.

Fig. 13 is an enlarged, longitudinal sectional view on line 13—13 of Fig. 4.

Fig. 14 is an enlarged, fragmentary perspective view of the needle per se.

Fig. 15 is a transverse sectional view on line 15—15 of Fig. 13.

Fig. 16 is an end elevational view of the sewing machine as seen from the left of Fig. 1, with the end plate removed.

Fig. 17 is a similar view to Fig. 11 but showing a modified form of this invention.

The reference numeral 20 has been generally applied in the several figures of the drawing to a conventional sewing machine head. The needle threading attachment constituting the present invention has been illustrated in operative association to said head and to the needle, and includes an elongated, open-ended, constant-diameter, threading attachment support tube 22 having adjacent its lower end a threaded opening 24 in which is threadably engaged a guide pin in the form of a screw 26 extending through a smooth-walled opening formed in a U-shaped collar 28 having at its lower end a hook-like guide 30 for the thread T of the sewing machine.

An open-ended threader block support member 32 is formed (see Fig. 7) with a closed, longitudinal guide slot 34 intermediate its ends receiving the reduced inner end of pin 26 (Fig. 15). The member 32 is thus held against rotation relative to the tube 22, but is shiftable upwardly and downwardly therein, with the extent of up-and-down movement being limited by the pin and slot means 26, 34.

Extending from end to end of the member 32 is a wide clearance slot 36, through which projects (Fig. 15) a needle lock screw 38, engaging the thickened head of a sewing machine needle 40 having a flat surface 42 against which the screw 38 bears.

The needle has, at its lower end, the usual eye 44, through which the thread T is to be drawn when the needle is being threaded.

The threading attachment additionally includes a horizontally extending, generally rectangular plunger support block 46 having adjacent one end (Fig. 12) a vertical bore 48. A transverse notch 50, opening downwardly upon the underside of the block, is in communication with the lower bore 48, the notch opening upon a shallow, angular recess 52 formed in the underside of the block.

Extending longitudinally and centrally of the block is a plunger bore 54, which, at that end of the block remote from the vertical bore 48, merges into a counterbore 56 which in turn merges into a threaded counterbore 58 in which is threadably engaged a screw 60. The screw 60 is of the sleeve type, and provides a guide for a plunger 62 one end of which projects outwardly from the block and has threaded thereon a button 64. The plunger 62, within the counterbore 56, has a stop or abutment collar 66. At its inner end, the plunger merges into a blade-like, thin, flat extension 68 proportioned to extend through the eye

44 as shown to particular advantage in Fig. 11. Guide pins 69 extend inwardly from the opposite sides of the block (Fig. 6) and bear lightly against the opposite side surfaces of the extension 68, to properly center said extension within the bore so that the extension will pass through the eye 44 on every occasion. The pins 69 can be threaded into the bore, so as to be adjustable transversely of the block for laterally shifting the blade-like extension within the plunger bore if necessary to properly align the extension with the eye of the needle.

A spring 70 is circumposed about the plunger within the counterbore 56, and is held under compression, one end of the spring bearing against the collar 66 and the other end bearing against the inner end of the counterbore 56. The spring 70, tending to expand, normally urges the plunger to the full line position of Fig. 12, but against the restraint of the spring, one may press the plunger inwardly from the Fig. 1 or Fig. 5 position to the Fig. 11 position, to extend the blade-like extension 68 through the eye of the needle.

Formed on the free end of extension 68 is a hook 72, adapted to engage the thread T when the thread is looped through the notch 50 in the manner shown in Fig. 13.

The block 46 is normally latched in an inoperative, upper position shown in Fig. 2, by means of a pivoted detent 74 having depending ears 76 through which extends a pivot pin 78 carried by the block 46. A spring 80 is interposed between the detent and the block, to normally urge the detent to the position thereof shown in Fig. 2. The lower end of the tube 22 has a circumferential groove 82, the top edge of which may be slightly beveled in a commercial embodiment of the invention, and the detent has a beveled inner end engageable in said groove when the block is to be inoperatively disposed, thus to lock or latch the block in its inoperative position.

To release the block, one need only press downwardly on the outer end of the detent. However, remote control means is desirable for this purpose, since, in view of the smallness of the parts, it is not desirable that one press directly upon the horizontally projecting block 46 and detent with the finger, since this would tend to move the block out of its proper position over a period of time, causing the blade or extension 68 to move out of alignment with the eye of the needle.

So as to prevent this, there is provided a detent-engaging release pin 88 formed upon one end of a flexible cable 90 housed in a cloth sheath 92. A bracket 84 is mounted upon the sewing machine head, and supports a pin housing 86, from which the pin 88 projects.

At its other end, the cable 90 is provided with a push button 94 projecting laterally from a cable support bracket 96 of Z shape mounted upon the head 20.

By pressing upon the button 94, one extends the pin 88, thus pressing downwardly upon the detent 74 to disengage the detent from the groove 82.

It will be seen that the tube 22, collar 28, member 32, block 46, plunger, and detent provide a self-contained assembly, the parts of which can be assembled separately and then slipped telescopically onto a needle post 96 of the sewing machine (Figs. 9 and 16). The needle post 96 has, at its upper end, a head 98 increased slightly in diameter relative to the main diameter of the needle post, the head 98 being engageable in a holder 100 of the sewing machine. At its lower end, the needle post is formed with a tube support portion 106 of reduced thickness, having a cross-sectional shape such that the member 32 can slip thereover. In other words, the portion 106 is of a cross-sectional area less than the inner diameter or cross-sectional area of the tube 22 and this defines, as shown in Fig. 9, a space between portion 106 and tube 22, into which space the member 32 is snugly but slidably fitted when the tube 22 is placed over the needle post. The member 32 has opposed, flat inner surfaces and the portion 106 of the needle post also has opposed, flat surfaces engageable against the flat surfaces of the member

32. The member 32 as previously noted herein is of partly cylindrical exterior cross section, and this is true also of the portion 106. All this is shown to particular advantage in Fig. 15.

Formed in the lower end of the portion 106 is an axial, downwardly opening socket 108 for the needle 40, and communicating with the socket 108 is a threaded opening 110 in which the screw 38 is threadably engaged. Thus, the needle is locked in the socket 108, and can be readily removed without removal of the threading attachment, since the needle and the post constitute a unitary assembly separate from and distinct from the unitary assembly shown in Fig. 7.

In use, the threading assembly is slipped onto the needle post in the manner previously described. At its upper end, the tube 22 has a bayonet slot 104, and the needle post 96 has a laterally projecting pin 102 engageable in the bayonet slot. Thus, the tube 22 is shifted upwardly upon the post 96, to cause the pin 102 to extend into the slot 104, after which the tube 22 is partially rotated to lock the pin in the inner end of the slot.

During normal use of the sewing machine, the member 32 and block 46 are in their upper, inoperative position shown in Fig. 2. If, however, it is desired to thread the needle, one need only release the detent 74 in the manner previously described, after which the block 46 is manually shifted downwardly to its Fig. 4 position. The member 32 is soldered or otherwise fixedly secured at its lower end to the block 46, and thus moves downwardly therewith, sliding in the space between the portion 106 of the needle post and tube 22.

The downward movement of the block and the member 32 is limited by the length of the slot 34, and at the lower limit of the travel of the block and block support member, the blade 68 will be aligned with the eye 44 as shown in Fig. 12.

One need only, at this time, pull the thread through the notch 50, after first depressing the plunger to shift the same to its Fig. 11 position. In other words, with the block 46 lowered, the plunger will initially be in the Fig. 5 position. The plunger is pressed inwardly through the eye of the needle, after which the thread T is pulled upwardly within the notch 50, to bear tightly against the bottom edge of the blade 68.

The plunger is now released, and the spring 70, tending to expand, will shift the plunger to the right in Fig. 11. This will cause the thread to be engaged by the hook 72 and pulled through the eye of the needle in the manner shown in Fig. 12.

One now shifts the block 46 and the member 32 upwardly, back to their Fig. 2 position, and this will pull the thread that is engaged by hook 72 upwardly, exposing the same so that it can be cut. The needle will now be threaded and the sewing operation may continue as before.

It will be seen that the construction is such as to facilitate the threading of the needle in a minimum amount of time, and it is not necessary that one make any positive effort to align the block with the needle. Nor is it necessary that one make any positive effort to visually locate the thread relative to the needle threading means. In other words, the necessity for exact positioning of any part of the threading means by visual determination is dispensed with, and the threading operation is carried out, as a result, with a minimum of difficulty or loss of time.

In Fig. 17 the spring 70' is shown in the counterbore 56' about the plunger 62' between the collar 66' and the screw cap 60' so as to force the hook 72' through the eye of the needle 40' automatically as the eye of the needle reaches alignment with the hook 72'. The hook 72' is then released by pulling the button 64' of plunger 62' in the direction of the arrow.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein

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disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A needle threading attachment for sewing machines comprising, in combination with a needle post a needle supported by said post, tubular means receiving said post, and means carried by the tubular means adapted to engage a thread and draw the same through the eye of said needle, said tubular means being formed as an open-ended tube having a detachable connection to said post, said second means including a block support member slidably mounted in the tube and extending outwardly thereof to shift longitudinally thereof, a block carried by said block support member, and plunger means slidably mounted inside the block, said member when shifted to one position being adapted to dispose the block and plunger means in alignment with the eye of the needle, for extension of the plunger means through said eye, said second means further including a guide pin carried by the tube, the block support member having a longitudinal closed slot therealong through which the guide pin extends, whereby to limit movement of the member in opposite directions, the guide pin when engaging against one end of the slot being adapted to stop the movement of the block support member whereby said member is in a position in which said plunger means is aligned with the eye of the needle, the block projecting laterally from one end of the block support member below the slot and said plunger being shiftable horizontally within the block, the plunger being spring loaded for movement to one position within the block, the plunger means in said one position being disposed clear of the path of the needle.

2. A needle threading attachment for sewing machines comprising, in combination with a needle post a needle supported by said post, tubular means receiving said post, and means carried by the tubular means adapted to engage a thread and draw the same through the eye of said needle, said tubular means being formed as an open-ended tube having a detachable connection to said post, said second means including a block support member slidably mounted in the tube and extending outwardly thereof to shift longitudinally thereof, a block carried by said block support member, and plunger means slidably mounted inside the block, said member when shifted to one position being adapted to dispose the block and plunger means in alignment with the eye of the needle, for extension of the plunger means through said eye, said second means further including a guide pin carried by the tube, the block support member having a longitudinal closed slot therealong through which the guide pin extends, whereby to limit movement of the member in opposite directions, the guide pin when engaging against one end of the slot being adapted to stop the movement of the block support member whereby said member is in a position in which said plunger means is aligned with the eye of the needle, the block projecting laterally from one end of the block support member below the slot and said plunger being shiftable horizontally within the block, the plunger being spring loaded for movement to one position within the block, the plunger means in said one position being disposed clear of the path of the needle, said plunger means including a blade-like extension proportioned to extend through the eye of the needle when the plunger is shifted against the restraint of its spring to an opposite extreme position.

3. A needle threading attachment for sewing machines comprising, in combination with a needle post a needle supported by said post, tubular means receiving said post, and means carried by the tubular means adapted to engage a thread and draw the same through the eye of said needle, said tubular means being formed as an open-ended tube having a detachable connection to said post,

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said second means including a block support member slidably mounted on the tube and extending outwardly thereof to shift longitudinally thereof, a block carried by said block support member, and plunger means slidably mounted inside the block, said member when shifted to one position being adapted to dispose the block and plunger means in alignment with the eye of the needle, for extension of the plunger means through said eye, said second means further including a guide pin carried by the tube, the block support member having a longitudinal closed slot therealong through which the guide pin extends, whereby to limit movement of the member in opposite directions, the guide pin when engaging against one end of the slot being adapted to stop the movement of the block support member whereby said member is in a position in which said plunger means is aligned with the eye of the needle, the block projecting laterally from one end of the block support member below the slot and said plunger being shiftable horizontally within the block, the plunger being spring loaded for movement to one position within the block, the plunger means in said one position being disposed clear of the path of the needle, said plunger means including a blade-like extension proportioned to extend through the eye of the needle when the plunger is shifted against the restraint of its spring to an opposite extreme position, said extension being formed with a hook adapted to engage the thread, whereby to draw the thread through the eye of the needle when the plunger is permitted to return under spring bias to its normal, first-named position.

4. A needle threading attachment for sewing machines comprising, in combination with a needle post, a needle supported by said post, tubular means receiving said post, and means carried by the tubular means adapted to engage a thread and draw the same through the eye of said needle, said tubular means being formed as an open-ended tube having a detachable connection to said post, said second means including a block support member slidably mounted in the tube and extending outwardly thereof to shift longitudinally thereof, a block carried by said block support member, and plunger means slidably mounted inside the block, said member when shifted to one position being adapted to dispose the block and plunger means in alignment with the eye of the needle, for extension of the plunger means through said eye, said second means further including a guide pin carried by the tube, the block support member having a longitudinal closed slot therealong through which the guide pin extends, whereby to limit movement of the member in opposite directions, the guide pin when engaging against one end of the slot being adapted to stop the movement of the block support member whereby said member is in a position in which said plunger means is aligned with the eye of the needle, the block projecting laterally from one end of the block support member below the slot and said plunger being shiftable horizontally within the block, the plunger being spring loaded for movement to one position within the block, the plunger means in said one position being disposed clear of the path of the needle, said plunger means including a blade-like extension proportioned to extend through the eye of the needle when the plunger is shifted against the restraint of its spring to an opposite extreme position, said extension being formed with a hook adapted to engage the thread, whereby to draw the thread through the eye of the needle when the plunger is permitted to return under spring bias to its normal, first-named position, the plunger means, at that end thereof remote from said extension, projecting beyond the block and being provided with a button to facilitate depression of the plunger against the restraint of the spring loading thereof.

5. A needle threading attachment for sewing machines comprising, in combination with a needle post, a needle supported by said post, tubular means receiving said post, and means carried by the tubular means adapted to engage a thread and draw the same through the eye

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of said needle, said tubular means being formed as an open-ended tube having a detachable connection to said post, said second means including a block support member slidably mounted in the tube and extending outwardly thereof to shift longitudinally thereof, a block carried by said block support member, and plunger means slidably mounted inside the block, said member when shifted to one position being adapted to dispose the block and plunger means in alignment with the eye of the needle, for extension of the plunger means through said eye, said second means further including a guide pin carried by the tube, the block support member having a longitudinal closed slot therealong through which the guide pin extends, whereby to limit movement of the member in opposite directions, the guide pin when engaging against one end of the slot being adapted to stop the movement of the block support member whereby said member is in a position in which said plunger means is aligned with the eye of the needle, the block projecting laterally from one end of the block support member below the slot and said plunger being shiftable horizontally within the block, the plunger being spring loaded for movement to one position within the block, the plunger means in said one position being disposed clear of the path of the needle, said plunger means including a blade-like extension proportioned to extend through the eye of the needle when the plunger is shifted against the restraint of its spring to an opposite extreme position, said extension being formed with a hook adapted to engage the thread, whereby to draw the thread through the eye of the needle when the plunger is permitted to return under spring bias to its normal, first-named position, the plunger means, at that end thereof remote from said extension, projecting beyond the block and being provided with a button to facilitate depression of the plunger against the restraint of the spring loading thereof, said block including a pivoted detent, the tube having a circumferential groove engaging said detent when the block and block support member are shifted longitudinally of the tube out of a needle-threading position.

6. A needle threading attachment for sewing machines comprising, in combination with a needle post, a needle supported by said post, tubular means receiving said post, and means carried by the tubular means adapted to engage a thread and draw the same through the eye of said needle, said tubular means being formed as an open-ended tube having a detachable connection to said post, said second means including a block support member slidably mounted in the tube and extending outwardly

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thereof to shift longitudinally thereof, a block carried by said block support member, and plunger means slidably mounted inside the block, said member when shifted to one position being adapted to dispose the block and plunger means in alignment with the eye of the needle, for extension of the plunger means through said eye, said second means further including a guide pin carried by the tube, the block support member having a longitudinal closed slot therealong through which the guide pin extends, whereby to limit movement of the member in opposite directions, the guide pin when engaging against one end of the slot being adapted to stop the movement of the block support member whereby said member is in a position in which said plunger means is aligned with the eye of the needle, the block projecting laterally from one end of the block support member below the slot and said plunger being shiftable horizontally within the block, the plunger being spring loaded for movement to one position within the block, the plunger means in said one position being disposed clear of the path of the needle, said plunger means including a blade-like extension proportioned to extend through the eye of the needle when the plunger is shifted against the restraint of its spring to an opposite extreme position, said extension being formed with a hook adapted to engage the thread, whereby to draw the thread through the eye of the needle when the plunger is permitted to return under spring bias to its normal, first-named position, the plunger means, at that end thereof remote from said extension, projecting beyond the block and being provided with a button to facilitate depression of the plunger against the restraint of the spring loading thereof, said block including a pivoted detent, the tube having a circumferential groove engaging said detent when the block and block support member are shifted longitudinally of the tube out of a needle-threading position, said threading attachment including remote control means for releasing the detent from engagement in the groove.

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