United States Patent [19]

Rosa

[11] **3,901,171**

[45] **Aug. 26, 1975**

[54] **THREAD WIPER**

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[22] Filed: **Aug. 5, 1974**

[21] Appl. No.: **494,519**

[52] **U.S. Cl.** **112/252**

[51] **Int. Cl.**[2] **D05B 65/00**

[58] **Field of Search** 112/252, 241–247

[56] **References Cited**

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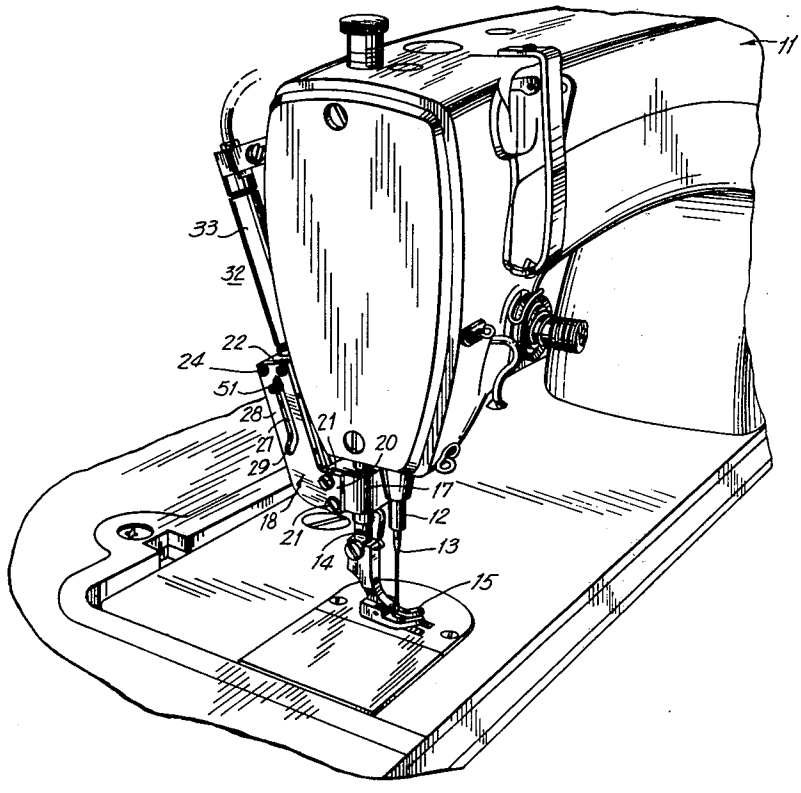
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[57] **ABSTRACT**

A sewing machine thread-wiping mechanism includes a pair of vertically extending parallel guide arms disposed rearwardly and above the reciprocating path of the sewing needle tip, one of the guide arms having a linear first slot and the other arm having a slot with an upper portion parallel to the first slot and an angulated lower portion. A pneumatic cylinder reciprocated slide member is located between the guide arms and carries a first follower engaging the first slot and a transverse rockable shaft provided with a crank arm carrying a second follower engaging the second slot. A picker arm extends radially from the shaft and terminates in a hook which, with the lowering and raising of the slide member, moves downwardly, forwardly, and rearwardly across the needle path, and then upwardly.

6 Claims, 5 Drawing Figures



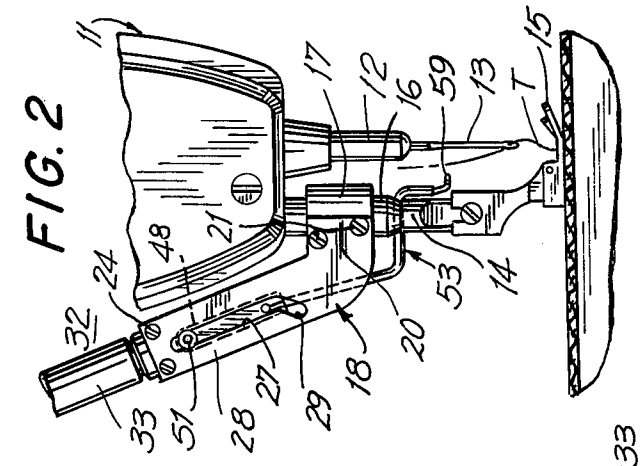


FIG. 2

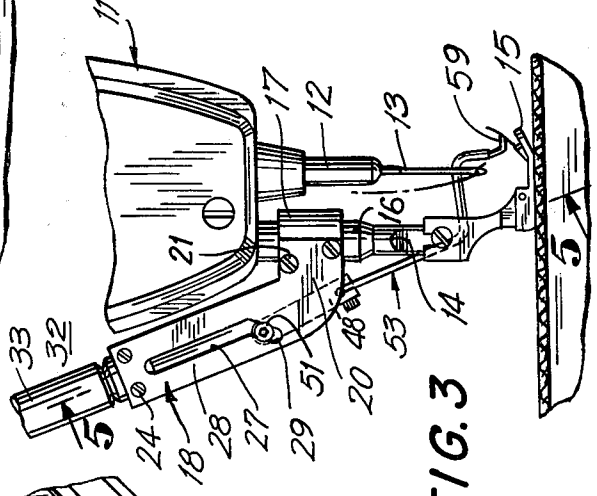


FIG. 3

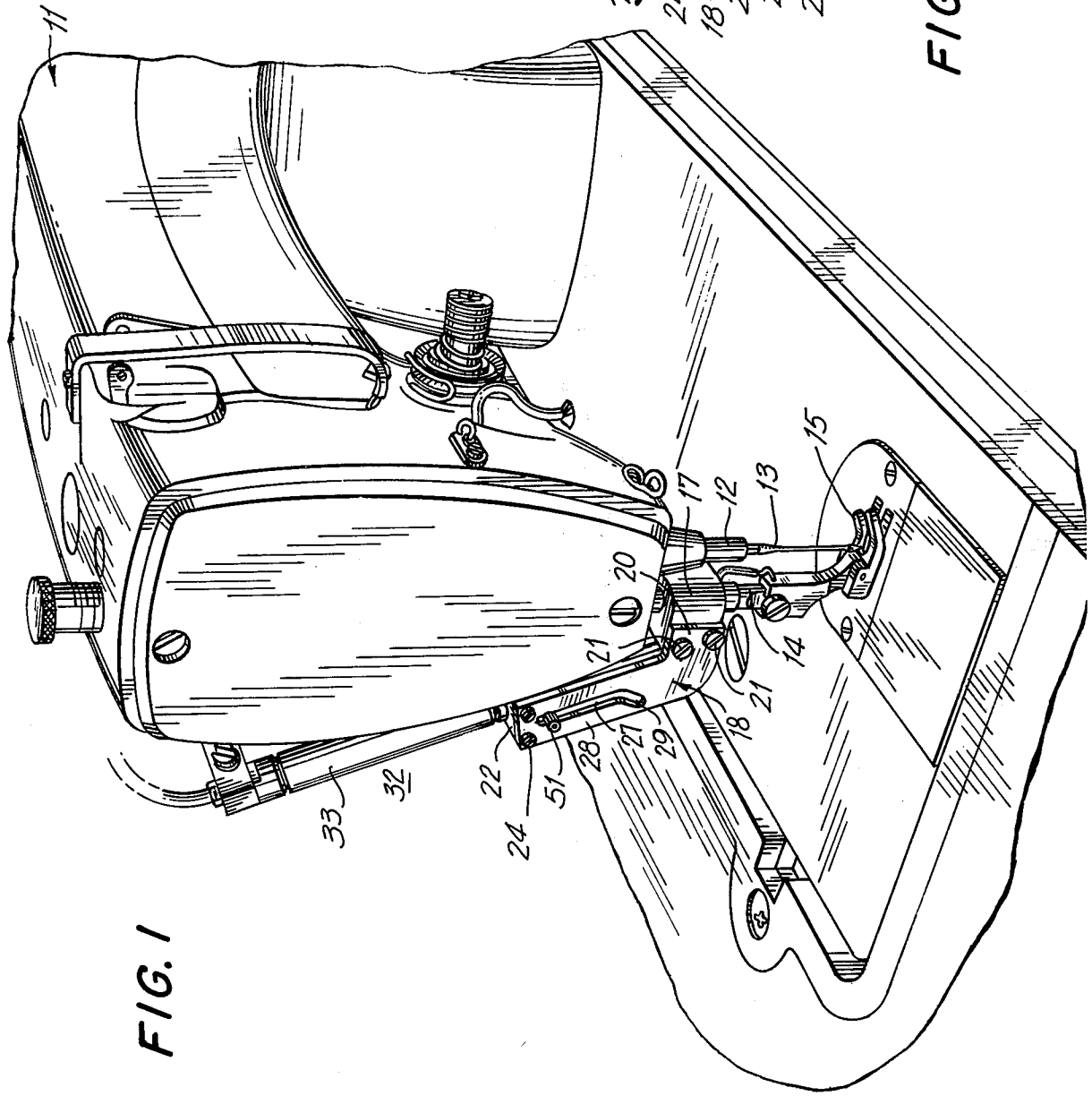


FIG. 1

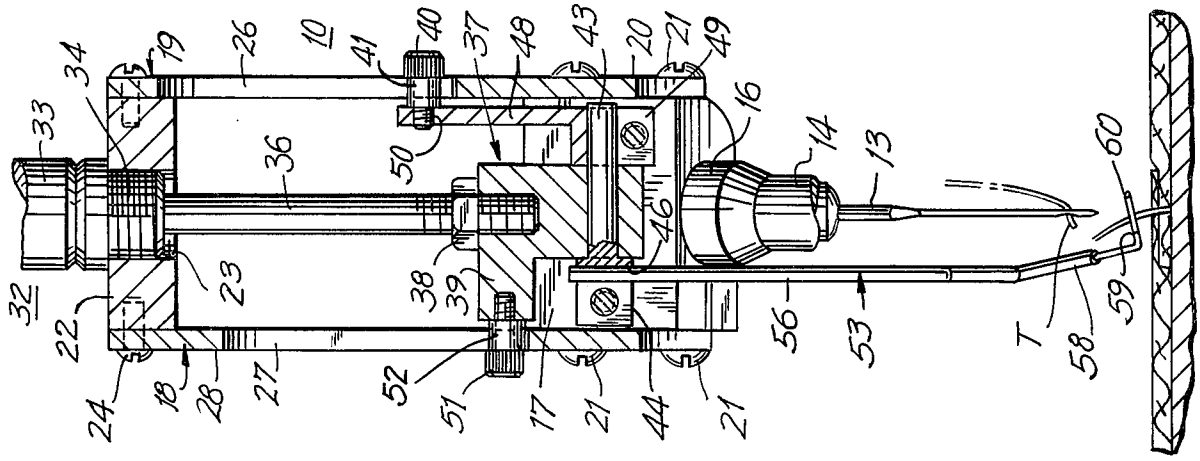

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FIG. 5

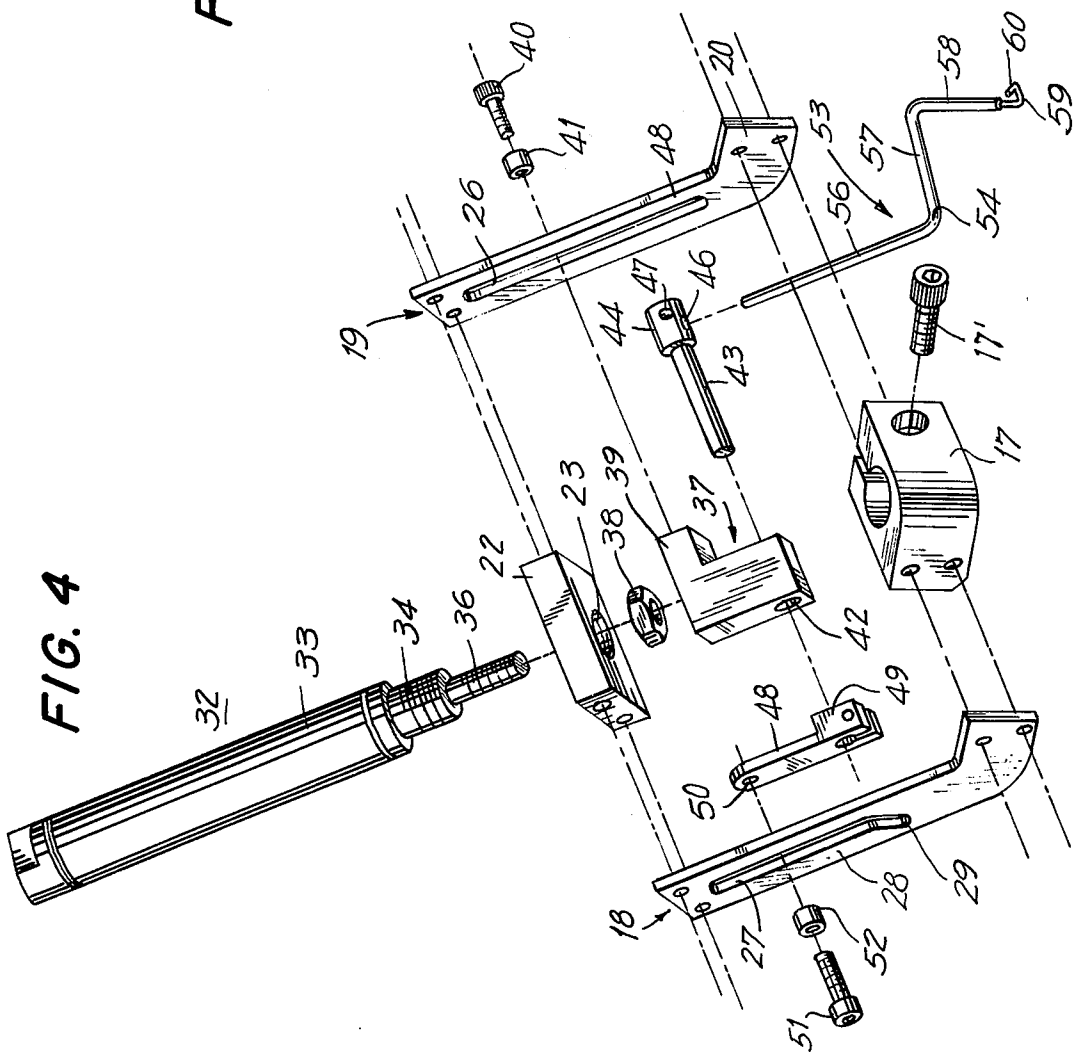

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FIG. 4

THREAD WIPER

BACKGROUND OF THE INVENTION

The present invention relates generally to improvements in sewing machines and it relates particularly to an improved thread wiping mechanism for withdrawing the severed thread from the path of the work piece following the application of a line of stitching.

In performing commercial sewing operations, it is necessary for maximum economy and efficiency to reduce to a minimum the number of time-consuming hand operations. Among such operations ordinarily manually performed and highly time consuming is the removal of the severed thread from the path of a work piece following the completion of a sewing sequence so as to facilitate the unhindered performance of the following sewing sequence. Many thread-wiping or retracting mechanisms for performing the above thread withdrawal operation have been available and proposed, but these possess numerous drawbacks and disadvantages. They are complicated and unreliable devices, difficult to mount on the conventional sewing machine without interfering with the operation thereof, are of little versatility and adaptability, and otherwise leave much to be desired.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide an improved sewing machine mechanism. Another object of the present invention is to provide an improved sewing machine thread wiping mechanism.

Still another object of the present invention is to provide an improved sewing machine thread wiping mechanism for withdrawing the severed thread from the path of a work piece upon the termination of a sewing sequence.

A further object of the present invention is to provide a mechanism of the above nature characterized by its reliability, ruggedness, simplicity, ease of application and high versatility and adaptability.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawings which illustrate a preferred embodiment thereof.

In a sense, the present invention contemplates the provision, in a sewing machine including a reciprocating needle, of a thread-wiping mechanism comprising a picker member including a hook element having a rearwardly directed opening and activating means located rearwardly of and above the reciprocated path of the needle point and supporting the picker member for successively lowering the picker member toward the needle path, rocking the picker member to advance and retract the hook member across the needle path and then retracting and raising the picker member above the lower end of the raised needle. In the preferred form of the improved mechanism, the actuating means includes a pair of transversely spaced, parallel, vertically extending tracks having formed therein first and second guide slots with parallel upper sections, the first slot having a cam-defining lower section angularly related to the slot upper sections, a slide member between said tracks, a transverse shaft journalled to the slide member, a crank arm mounted on the shaft and carrying a first follower engaging the first slot, a second follower on the slide member engaging the second slot, the picker member including an arm extending radially from the shaft and terminating in the hook member, and means for reciprocating the slide member along the tracks.

The improved thread-wiping mechanism is highly reliable, simple, rugged, easy to apply and use, and of great versatility and adaptability.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a sewing machine head provided with a thread retracting mechanism embodying the present invention; FIG. 2 is a fragmentary end view thereof illustrating the thread retractor in its retracted condition;

FIG. 3 is a view similar to FIG. 2 showing the retractor in its advanced condition;

FIG. 4 is an exploded perspective view of the thread retractor mechanism; and

FIG. 5 is a rear elevational view, partially in section, of the assembled mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings which illustrate a preferred embodiment of the present invention, reference numeral **10** generally designates the improved thread retractor or wiper mechanism illustrated, applied to a sewing machine head **11** of conventional construction. The sewing machine head **11** includes at its outer end a vertically reciprocating needle **13.** A rockable presser foot **15** is mounted in a bar **14** directly rearwardly of needle **13** and is vertically movable with the bar **14** between raised and depressed positions in a known manner. Head **11** is provided with the conventional thread tensioning and guide devices, drive mechanisms, feed dogs and the like, and the bar **14** slidably axially engages a bushing **16.**

The thread retractor mechanism **10** includes a mounting block **17** in the form of a split collar having a longitudinal bore engaging the bushing **16** and firmly clamped thereto by a locking screw **17'**, engaging axially aligned transverse bores in the arms of the split collar block **17,** one of the bores being tapped and the other counterbored. A pair of laterally spaced parallel rearwardly upwardly inclined side arms **18** and **19** are provided at their bottoms with forwardly directed fingers **20** which are secured to the side faces of mounting block **17** by screws **21.** A cross-bar **22** having a central vertically extending tapped bore **23** extends between and is secured by screws **24** to the upper ends of arms **18** and **19.** Formed in side arm **19** is a medial longitudinally extending straight guide slot **26,** and formed in side arm **18** is a longitudinally extending cam slot **27** including a medial straight section **28** joining at its bottom a short downwardly rearwardly inclined section **29.**

A linear actuator **32,** shown in the form of a spring retracted compressed air cylinder, although other types of actuators may be employed, includes a cylinder member **33** provided at its inner end with a threaded axial sleeve **34** which tightly engages the bar threaded bore **23.** Actuator **32** includes a spring retracted piston having an axial piston rod **36** slidably telescoping sleeve **34.** The upper part of cylinder **33** is connected by way of a selectively or automatically actuated valve system

of known construction, alternatively to a compressed air source or exhaust.

A slide block **37** is positioned between arms **18** and **19** and has a tapped longitudinal bore engaging the threaded end of piston rod **36**, and firmly locked thereto by a nut **38** engaging the piston rod threaded end and bearing on the upper face of slide block **37**. An arm **39** projects from the upper part of block **37** toward side arm **19**, and is provided with a tapped transverse bore engaged by a screw **40** which projects through slot **26** and supports an axial roller **41** in longitudinal slidable engagement with guide slot **26**.

A transverse bore **42** is formed in the lower part of block **37** and a shaft **43** projects through and is journalled in the bore **42**. One end of shaft **43** underlies ear **39** and is provided with an enlarged cylindrical head **44** having a diametric bore **46** and a medial slit delineating opposite clamp arms on opposite sides of bore **46**. The clamp arms are provided with aligned bores **47** in quadrature with an outside bore **46**, one of the bores **47** being tapped, bores **47** being engaged by a screw to permit the tightening of the clamp arms.

The end of shaft **43** opposite to enlarged head **44** has rigidly attached thereto a radially extending crank arm **48** having an enlarged split collar at its lower end **49** which collar is clamped to the shaft **43**. The crank arm **48** extends upwardly from shaft **43** and is provided proximate its free end with a tapped bore **50** engaged by a screw **51** which carries a freely rotatable follower-defining roller **52** in sliding engagement with cam slot **27**.

A retractor or picker arm **53** is supported by and movable with shaft head **44** and is formed of stiff wire or rod which, except for the outer free end, is enclosed in a plastic sheath **54**. The picker arm **53** includes a substantially straight upper leg **56** whose upper end engages and is clamped in bore **46** of head **44**, and which depends from head **44** and is laterally offset to the right of the path of needle **13** as viewed in FIG. **1**. Projecting forwardly from the lower end of leg **56** is an intermediate leg **57** which joins at its forward end a depending leg **58** which is slightly inclined to the left. The leg **58** terminates in an integrally formed hook member **59** which is rearwardly open and includes an end leg **60** which is longitudinally aligned across the reciprocating path of the needle **13**, and is inwardly and rearwardly inclined from its base so that with the forward movement of the hook member **59**, the thread depending from the raised needle **13** is engaged by hook leg **60** and laterally displaced until the hook member **59** advances forwardly of the needle path.

Considering now the operation of the thread wiping mechanism described above, under normal sewing conditions the cylinder **32** is exhausted and piston rod **36** is retracted thereby to raised positions as shown in FIGS. **1** and **2**. Under the above conditions, followers **41** and **52** register with the upper ends of slots **26** and **27** respectively so that the picker arm **53** is rearwardly swung and the hook member is in a raised position, rearwardly of the needle **13** and completely outside the sewing or operating space of the sewing machine.

Upon completion of a sewing operation with the picker arm in its retracted position, the needle **13** is stopped in its fully raised position and the needle thread T depending from the needle **13** is cut either manually or automatically. Thereafter, cylinder **32** is sequentially connected either automatically or manually to compressed air and then to exhaust thereby successively to lower and to raise piston rod **36** and slide block **37**. With the lowering of the slide block, the picker arm **53** which is carried by the shaft **43** is lowered, and during the initial major portion of its depression, does not rock since the follower engaged slots **26** and **27** are parallel. When the picker arm **53** reaches a depressed position at which the lower section **29** of slot **27** is engaged by follower **52**, the hook member **59** is at a level between the bottom of raised needle **13** and foot piece **15**. At the slide block **39** is further lowered by piston rod **36**, the follower traverses slot section **29** to rock shaft **43** clockwise by way of arm **43** thereby to swing picker arm **53** and hook member **59** forwardly across the path of needle **13**. With the forward movement of hook member **59**, the thread T depending from needle **13** is momentarily laterally displaced by hook leg and returns into alignment with the opening of hook member **59** to finish the advance stroke of the mechanism.

The cylinder **32** is then connected to exhaust and the piston rod **36** is spring returned to its raised position, and the picker arm **53** and the hook member **59** thereby effect a motion opposite to that effected with the advance stroke of the piston rod **36**. Upon the rearward movement of hook member **59**, the cut thread T is engaged and moved rearwardly and then upwardly with the raising of the picker arm **53** to complete the cycle and withdraw the thread from the sewing area.

While there has been described and illustrated a preferred embodiment of the present invention, it is apparent that numerous alterations, additions and omissions may be made without departing from the spirit thereof.

I claim:

1. In a sewing machine including a needle reciprocatable along a path between a raised and a lowered position, a thread wiping mechanism comprising a picker member including a hook element having a rearwardly directed opening and actuating means disposed rearwardly and above said needle path and supporting said picker member for successively lowering said picker member toward said needle path, rocking said picker member to advance and retract said hook member across said needle path and then retracting and raising said picker member above the path of the lower end of said needle.

2. The thread wiping mechanism of claim **1** wherein said actuating means comprises a slide member reciprocatable between raised and lowered positions, said picker member being swingably supported by said slide member, a stationary member and a follower coupled to said picker member and engaging said stationary member along the lower path of said slide member to swing said picker member forwardly and rearwardly with the lowering and raising of said slide member proximate the bottom of its path.

3. The thread wiping mechanism of claim **2** wherein said picker member includes an elongated arm extending downwardly from said slide member and terminating in said hook element.

4. The thread wiping mechanism of claim **3** wherein said actuating means comprises a transverse shaft journalled to said slide member and supporting said picker member, and a crank arm secured to said shaft and supporting said follower eccentrically to said shaft.

5. The thread wiping mechanism of claim **1** wherein said actuating means comprises a pair of transversely

spaced parallel vertically extending side arms disposed rearwardly and above said needle path and having formed therein first and second guide slots having parallel linear upper sections, said first slot having a cam defining lower section angularly related to said slot upper section, a slide member slidably disposed between and movable along said tracks, a transverse shaft journalled to said slide member, a crank arm mounted on said shaft, a first follower located on said crank arm and engaging said first slot, a second follower located on said slide member and engaging said second slot, said picker member including an arm extending from said shaft and terminating in said hook member, and means for reciprocating said slide member.

6. The thread wiping mechanism of claim 5 wherein said slide member reciprocating means comprises a pneumatic cylinder having a piston rod connected to said slide member.

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