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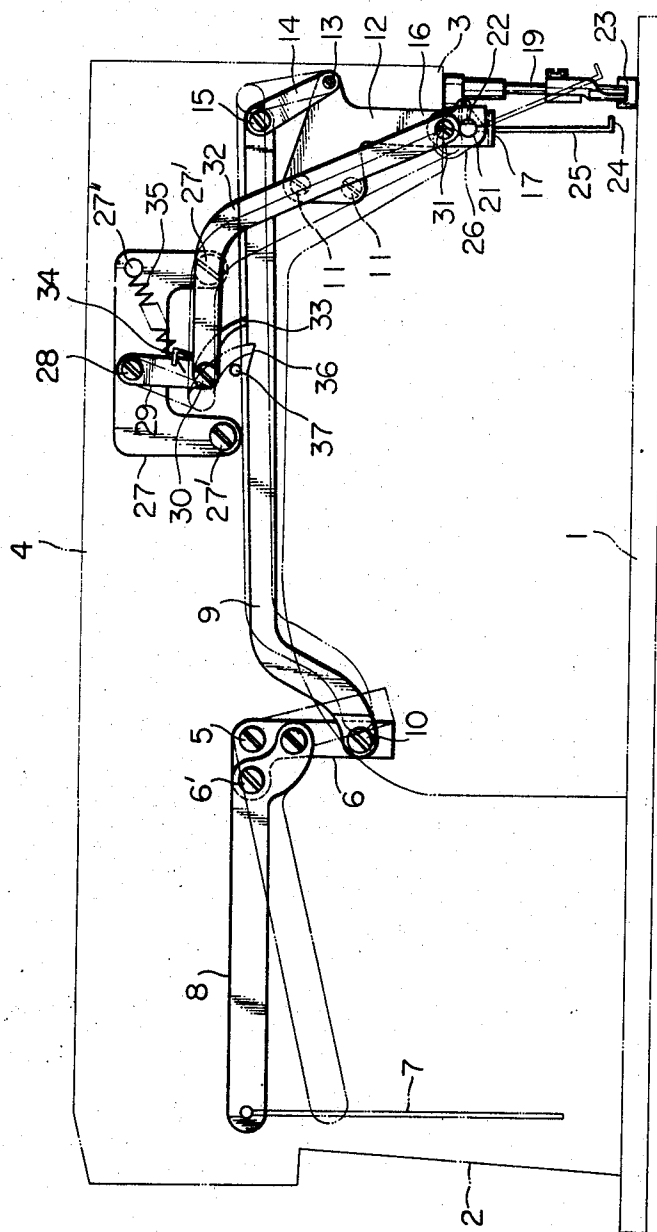
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WIPER MECHANISM IN SEWING MACHINE

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2 Sheets-Sheet 1

Fig. 1



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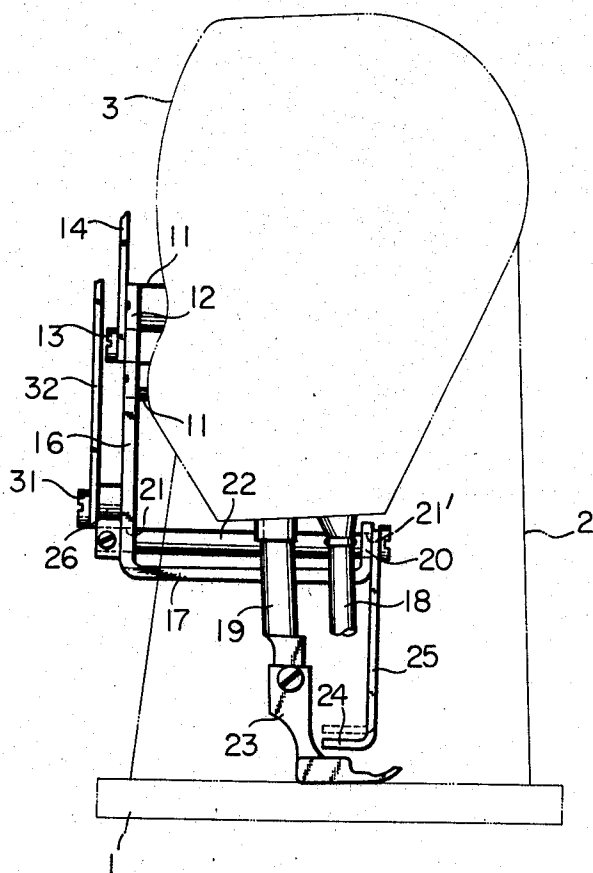
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WIPER MECHANISM IN SEWING MACHINE

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Fig. 2



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WIPER MECHANISM IN SEWING MACHINE

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1 Claim

ABSTRACT OF THE DISCLOSURE

Wiper mechanism in a sewing machine for taking up
above the presser foot the thread ends extending from the
stitched cloth under the needle plate after they are cut by
a thread cutting device at the end of the stitching operation,
said sewing machine being provided with an automatic device
for positioning the needle at a position adjacent to its lower
dead point at the end of the stitching operation and thereafter,
by the actuation of a lever in said device in one direction,
retracting the needle from the cloth toward its upper dead
point and stopping the needle at a position adjacent to its
upper dead point, said thread cutting device being operatively
coupled with said automatic device so as to cut said thread
ends while the needle is moving toward its upper dead point,
said wiper mechanism comprising a wiper located above the
presser foot and adapted to be moved along a path intersecting
the path of the up-and-downward movement of the needle
which carries with it the upper thread, said wiper being
made ready to be moved along said path intersecting the
path of the needle when the needle is positioned above the
presser foot in connection with the actuation of the lever
of said automatic device in said one direction, said wiper
being thereafter moved along said path intersecting the
path of the needle by the return movement of said lever
so as to take up said thread ends extending from the cloth
above the presser foot, and said wiper being returned to
its initial position clear of the path of the needle just
before said lever is returned to its initial position.

BACKGROUND OF THE INVENTION

The present invention relates to a novel wiper mechanism
in a sewing machine, and more particularly, to a novel
wiper mechanism in a sewing machine for taking up above
the presser foot the thread ends located under the needle
plate and extending from the stitched cloth after they are
cut at the end of the preceding stitching operation when the
up-and-downwardly moving needle which carries with it the
upper thread is stopped at a position above the presser
foot.

In a sewing machine, when a cloth to be stitched is
clamped between the presser foot and the needle plate after
moving the cloth through the space between the presser
foot and the upper surface of the needle plate from a position
near the operator to a position distant from the operator
with the thread ends extending from the cloth after they
are cut at the end of the preceding stitching operation being
suspended under the lower surface of the needle plate, the
thread ends are pulled out by the movement of the cloth
from the lower surface of the needle plate to the space
between the upper surface of the cloth and the lower
surface of the presser foot. Under such a condition, when
the presser foot is actuated to press the cloth and the
stitching operation is commenced with the thread ends
being clamped between the upper surface of the cloth and
the lower surface of the presser foot, thread ends of substantial
length are left on the cloth by the stitching operation

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tion thereby impairing the appearance of the stitched
cloth, because the length of the threads extending from the
cloth under the needle plate after they are cut at the end
of the preceding stitching operation is determined in such
a manner that after they are cut the thread ends protrude
from the lower surface of the cloth when the upper thread
forms a knot together with the lower thread at the beginning
of the stitching operation which is effected under the condition
that the protruding thread ends are made free from the
presser foot by moving the presser foot to the released
position and that the upper thread is pulled upwardly by
the action of the thread take-up lever. Therefore, it is
necessary, in order to improve the appearance of the
stitched cloth, to utilize hand scissors for cutting off the
ends of the threads extending from the cloth before the
next stitching operation is commenced, thereby resulting
in the disadvantages that the overall efficiency of the
stitching operation is lowered and the appearance of the
stitched cloth is sometimes impaired by damage done to
the cloth by the operation of the hand scissors.

SUMMARY OF THE INVENTION

The present invention avoids the above-mentioned disadvantages
by providing a wiper mechanism including a wiper which
is located above the presser foot and by means of which
the thread ends extending from the cloth under the needle
plate after they are cut at the end of the preceding stitching
operation are taken up above the presser foot so that the
thread ends do not enter the space beneath the lower surface
of the presser foot.

The wiper mechanism in accordance with the present
invention is applicable to a sewing machine of the type
which is provided with a device which automatically stops
the needle at a position adjacent to the lower dead point
thereof and, thereafter, moves the needle toward its upper
dead point apart from the presser foot by the actuation in
one direction of a lever provided in said device and stops
the needle at a position adjacent to its upper dead point,
and a thread cutting device which is actuated to cut the
portions of the threads extending from the cloth at a
position adjacent to the lower surface of the needle plate
while the needle is moved to its upper dead point by the
operation of the lever.

The wiper mechanism in accordance with the present
invention is actuated in connection with the above-mentioned
automatic device for stopping the needle and the thread
cutting device in such a manner that, when the needle is
stopped at the upper dead point by the actuation in one
direction of the lever while the thread ends extending from
the cloth under the needle plate are cut by means of the
thread cutting device, the wiper mechanism is actuated by
the actuation in said one direction of the lever through
linkage means so that the thread catching portion provided
at the outer end of the wiper is ready for taking up the
thread ends above the presser foot and, by releasing the
lever toward its initial position, the thread catching portion
of the wiper is moved along a path above the presser foot
intersecting the path of the up-and-downward movement
of the needle so as to take up the thread ends extending
from the cloth above the presser foot, and the wiper is
returned to its initial position clear of the path of the
needle just before the lever is returned to its initial position
by the action of a stopper pin cooperating with the linkage
means during the return movement of the wiper mechanism,
so that the machine is ready for the next stitching operation.

It is, therefore, an object of the present invention to
provide a novel construction of a wiper mechanism in a
sewing machine which takes up above the presser foot the
thread ends extending from the cloth to be stitched under
the needle plate after they are cut at the end of

the preceding stitching operation so that the thread ends do not enter the space between the presser foot and the cloth so that the manual cutting of the thread ends extending from the cloth prior to the next stitching operation is made unnecessary.

Another object of the present invention is to provide a novel wiper mechanism in a sewing machine, which is coupled with the automatic device for stopping the needle in position and the thread cutting device as aforementioned, and which takes up above the presser foot the thread ends extending from the stitched cloth under the needle plate after they are cut at the end of the preceding stitching operation without leaving the thread ends between the presser foot and the cloth by the actuation in one direction of the lever of the automatic device after the machine is stopped so that the machine is ready for the next stitching operation to produce stitched cloth of high quality without being impaired by the thread ends attached to the cloth at the beginning of the next stitching operation.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic side elevation of a sewing machine incorporating the wiper mechanism in accordance with the present invention, and

FIG. 2 is an end elevational view of the machine of FIG. 1 as seen from the side of the head of the machine.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, particularly to FIG. 1, the sewing machine comprises a bed 1, a vertical standard 2 mounted on bed 1 and an overhanging arm 4 integral with standard 2 at its one end and provided with head 3 at the other end. Lever 6 is pivotably mounted on the side of arm 4 adjacent to the upper portion of vertical standard 2 by means of stepped machine screw 5, connecting rod 8 being fixedly secured to the upper portion of said lever 6 at its one end at an angle relative to lever 6 by means of set screws 6', the other end of said connecting rod 8 being operatively connected to a foot pedal (not shown) through chain 7, thereby limiting the upward movement of connecting rod 8, while the latter is rotated counterclockwise about the axis of stepped machine screw 5 together with lever 6 by the actuation of the pedal through chain 7. One end of elongated link 9 is rotatably secured to the lower end of said lever 6 by means of stepped machine screw 10, the other end of said link 9 being pivotably connected to one end of short link 14 by means of stepped machine screw 15, the other end of said short link 14 being in turn pivotably secured to mounting plate 12 by means of stepped machine screw 13, said mounting plate 12 being fixedly secured to the side of head 3 by means of set screws 11. Lever 6 is always biased to rotate clockwise about the axis of stepped machine screw 5 by means of a spring not shown, the clockwise movement of lever 6 being limited by the pedal through chain 7 interconnecting the pedal with connecting rod 8 which is fixedly secured to lever 6. As shown in FIGS. 1 and 2, mounting plate 12 is provided with depending portion 16 extending downwardly from its lower end, the lower end of said depending portion 16 being provided with bent portion 17 extending at right angle from the lower end of depending portion 16 beneath the lower end of head 3 and behind needle bar 18 and presser bar 19 as shown in the drawings. The outer end of said bent portion 17 is provided with upstanding lug 20 extending upwardly at right angle from the outer end of bent portion 17 so that lug 20 together with bent portion 17 and depending portion 16 forms O-shaped configuration with depending portion 16 and upstanding lug 20 extending in parallel relationship to each other. Depending portion 16 is provided with hole 21 which is in alignment with hole 21' provided in upstanding lug 20. Shaft 22 is rotatably journaled in holes

21, 21', one end of said shaft 22 protruding outwardly from lug 20 fixedly mounting thereon a wiper 25 which is provided with thread catching portion 24 at the lower end thereof, while the other end of said shaft 22 protruding outwardly from depending portion 16 fixedly mounts thereon an arm member 26. Said thread catching portion 24 is located adjacent to the upper surface of presser foot 23 mounted on the lower end of presser bar 19 and is so arranged and shaped that said thread catching portion 24 extends at an angle from the lower end of wiper 25 so as to be directed in advance to the direction of the feed of the cloth to be stitched in the stitching operation so that said thread catching portion 24 can catch the threads when it is actuated as herein-after described. Mounting plate 27 is fixedly secured to the side of overhanging arm 4 by means of set screws 27'. Link 29 is pivotably mounted at its one end on said mounting plate 27 by means of stepped machine screw 28, the other end of said link 29 being provided with a stepped machine screw 30 fixedly secured thereto, which pivotably supports one end of link 32 as well as a pawl 33. The other end of link 32 is rotatably connected to the outer end of arm member 26 by means of shaft 31 fixedly secured thereto. Said pawl 33 is biased to rotate clockwise about the axis of said stepped machine screw 30 by means of spring 34, the coiled center portion thereof surrounding said stepped machine screw 30, while the outer ends of said spring 34 abut against link 29 and pawl 33, respectively. Therefore, said pawl 33 is adapted to engage with the upper side surface of link 9. One end of spring 35 is secured to mounting plate 27 by means of pin 27" secured to mounting plate 27, while the other end of spring 35 is secured to link 29, so that link 29 is always biased to rotate counterclockwise about the axis of stepped machine screw 28.

An arresting cut-out portion 36 is provided on the upper side surface of link 9 adjacent to the position of said pawl 33. Said arresting cut-out portion 36 is engaged with said pawl 33 when said link 9 is moved toward the right and slightly upwardly by virtue of the connection thereof to lever 6 and link 14 by the rotation of lever 6 counterclockwise against the action of the spring biasing said lever 6 clockwise, said counterclockwise rotation of lever 6 being effected by the operation of the pedal through chain 7 and connecting rod 8. When the pedal is released so as to return lever 6 to its initial position, link 9 is returned toward the left with said arresting cut-out portion 36 in engagement with pawl 33. However, said pawl 33 is disengaged from arresting cut-out portion 36 just before said lever 6 reaches the initial position by the engagement of said pawl 33 with stopper pin 37 which is secured to the side of arm 4.

As previously described, the sewing machine of the present invention is provided with the automatic device for stopping the needle at a position adjacent to its lower dead point and, thereafter, by the actuation in one direction of the lever which is common with said lever 6, the needle is moved toward its upper dead point and stopped at a position adjacent to the upper dead point and with the thread cutting device which cuts the thread ends extending from the cloth at the lower surface of the needle plate while the needle is moving toward its upper dead point.

Since the present invention is constructed as described above, when the pedal is depressed so as to actuate lever 6 through chain 7 and connecting rod 8 after the needle is stopped at a position adjacent to its lower dead point by the actuation of the automatic device for stopping the needle, the needle is retracted from the cloth and is moved upwardly and stopped at a position adjacent to the upper dead point thereof while the thread ends extending from the cloth are cut at the lower surface of the needle plate.

By the anticlockwise rotation of lever 6, link 9 is moved to the right and, at the same time, link 9 is moved slightly

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upwardly by the swinging movement of link 14 connected to link 9 so that link 9 comes to the position shown by the two dot chain line in FIG. 1. At this time, pawl 33 is engaged with arresting cut-out portion 36 of link 9. When the pedal is released after the thread ends extending from the cloth have been cut, link 9 is moved to the left with said pawl 33 in engagement with said arresting cut-out portion 36 thereby rotating link 29 clockwise against the action of spring 35, and hence, rotating arm member 26 anticlockwise about the axis of shaft 22 through link 32. Therefore, wiper 25 connected to arm member 26 through shaft 22 is rotated in the same direction as arm member 26, so that thread catching portion 24 provided at the outer end of wiper 25 is swung along a path intersecting the path of the up-and-downward movement of the needle while the needle is stopped at a position adjacent to its upper dead point, thereby taking up above the upper surface of presser foot 23, the thread ends which have been cut and are hanging from the cloth under the lower surface of the needle plate. During successive movement of link 9 toward the left, the movement of pawl 33 is stopped by means of stopper pin 37 as described above and, at the same time, link 9 is slightly lowered by virtue of the swinging movement of link 14 connected to link 9, thereby disengaging pawl 33 from arresting cut-out portion 36 of link 9 so that link 29 is returned to its initial position as shown by solid line in FIG. 1 by the action of coil spring 35 and hence, arm member 26 as well as wiper 25 with its thread catching portion 24 is returned to the initial position as shown by solid line in FIG. 1 through link 32, so that the thread catching portion is moved clear of the path of the needle just before the machine is returned to its initial starting position.

As described above, the present invention provides a novel construction of wiper mechanism in which the wiper located above the presser foot takes up above the presser foot the thread ends extending from the cloth to be stitched under the needle plate which have been cut by the thread cutting device when the needle which carries with it the upper thread and moved up and down during the stitching operation is stopped at its upper position apart from the presser foot by the actuation in one direction of the lever, and thereafter, the wiper is returned to its initial position clear of the path of the movement of the needle by the return movement of the lever before the next stitching operation is commenced. Therefore, the present invention has significant effectiveness in that it dispenses with the troublesome and inefficient manual operation of hand scissors for cutting off the thread ends extending from the cloth located between the upper surface of the cloth and the lower surface of the presser foot

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at the beginning of the next stitching operation as is the case of the prior art, which operation impairs the appearance of the stitched cloth.

I claim:

1. A wiper mechanism for a sewing machine having a presser foot for taking up above said presser foot the thread ends extending from the stitched cloth under the needle plate after they are cut by a thread cutting device at the end of a stitching operation comprising a first link having an outer end and swingably mounted on the sewing machine to swing about a pivot provided on said machine, a second link pivotably connected at its one end to said outer end of said first link and being constantly biased toward one direction, said second link being provided with an arresting cut-out portion, a third link having a lower end and swingably mounted on said machine to swing about a pivot provided on said machine, a fourth link having a first end and a second end and pivotably connected at its said first end to said lower end of said third link, a pawl pivotably mounted at said lower end of said third link and biased by a spring toward a direction to allow engagement thereof with said arresting cut-out portion, a wiper located above said presser foot of said machine, an arm linked to said second end of said fourth link and operatively coupled with said wiper to impart a swinging motion to said wiper, and a stopper pin mounted on said machine for limiting the movement of said pawl, whereby when said second link is actuated to move it toward a direction opposite to said one direction against the biasing force, said pawl engages with said arresting cut-out portion, and thereafter when said second link is returned to its initial position under the biasing force, said pawl and said second link swing by virtue of the engagement of said pawl with said arresting cut-out portion, thereby actuating said wiper to take up the thread end above the presser foot, and at the end of the return movement of said second link said pawl is disengaged from said arresting cut-out portion by said stopper pin, thereby permitting said fourth link to move the wiper to its initial position.

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