

SINGER
136W110

USE ONLY
SINGER

“OIL FOR HIGH SPEED SEWING MACHINES
(Cloth and Leather)”

for general use

or

“STAINLESS OIL
FOR HIGH SPEED SEWING MACHINES”

where a stainless oil is desired.

These specially prepared oils are the result of extensive research. They ensure freedom from lubricating trouble and give longer life to sewing machines.

**THE IMPORTANCE OF USING
SINGER NEEDLES FOR
SEWING MACHINES**

The best stitching results will be obtained by using the needles furnished by the Singer Sewing Machine Company.

Singer Needles can be purchased from any Singer Shop for the Manufacturing Trade.

Genuine Singer Needles should be used
in Singer Machines.
These Needles and their Containers
are marked with the
Company's Trade Mark "SIMANCO." 1

Needles in Containers marked
"For Singer Machines"
are not Singer made needles. 2

Copyright, U S. A.,
1914, 1922, 1924, 1925, 1926, 1927, 1929, 1933, 1934, 1935 and 1936,
by The Singer Manufacturing Company
All Rights Reserved for all Countries

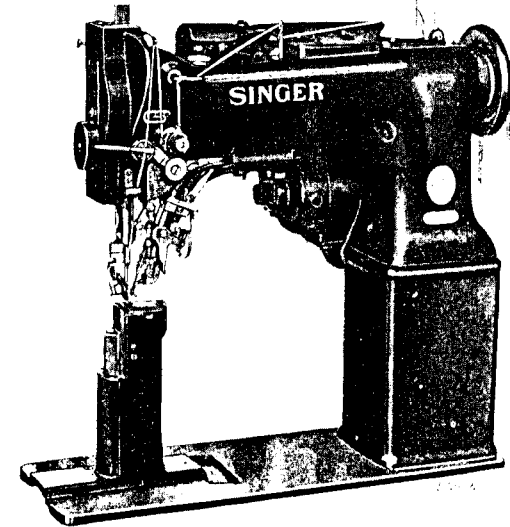
2125w

INSTRUCTIONS

FOR USING AND ADJUSTING

SINGER SEWING MACHINE

136w110



Post Bed, Continuous Wheel Feed
For Leather Work

INDEPENDENTLY DRIVEN

Oblique Underedge Trimmer

THE SINGER MANUFACTURING CO.

To all whom it may concern:

The placing or renewal of the name "Singer" (Reg. U. S. Pat. Off.) or any of the trade marks of The Singer Manufacturing Company on any machine that has been repaired, rebuilt, reconditioned or altered in any way whatsoever outside a Singer factory or an authorized Singer agency is forbidden.

Purchasing of Parts and Needles

Supplies of parts and needles for Singer machines can be purchased at any Singer Shop for the Manufacturing Trade or ordered by mail. If orders are sent by mail, money or a post office order covering their value, including postage, should be enclosed and the order will then be promptly filled and forwarded by mail or express.

Genuine Singer Needles should be used
in Singer Machines.
These Needles and their Containers
are marked with the
Company's Trade Mark "SIMANCO." 1

Needles in Containers marked
"For Singer Machines"
are not Singer made needles. 2

DESCRIPTION

Machine 136w110 is a single needle, lock stitch post machine for simultaneously stitching the edges and undertrimming the linings of shoes, sandals, slippers, etc.

It has an oblique underedge trimmer which is driven by an independent motor on the arm of the machine. The trimmer may be adjusted to trim either back of or opposite the needle. The trimmer motor is regularly furnished for operation on 115 volt direct current or 115 volt, 60 cycle alternating current. Be sure that the electric supply corresponds to this before connecting the motor.

The machine is fitted with three pairs of feed gears which are instantly adjusted to make any one of three predetermined lengths of stitches without removing any of the gears from the machine. See list of feed gears on page 10.

If desired, the machine can be limited to making but one or two lengths of stitches, as two spacing washers which are quickly substituted for the feed driving pinions (as instructed on page 12), are regularly furnished with each machine.

Speed

The maximum speed recommended for Machine 136w110 is 3000 stitches per minute. The machine should be run slower than the maximum speed at first, until the parts which are in movable contact have become glazed by their action upon each other. When the machine is in operation, the balance wheel should always turn over toward the operator.

Needles

Needles for Machine 136w110 are of Class and Variety 16x226, and are furnished in sizes 9, 10, 11, 13, 14, 16, 17 and 18.

The size of the needle to be used should be determined by the size of the thread, which must pass freely through the eye of the needle. If rough or uneven thread is used or if it passes with difficulty through the eye of the needle, the successful use of the machine will be interfered with.

Orders for needles must specify the **quantity** required, the **size** and the **class** and **variety** numbers separated by the letter x.

The following is an example of an intelligible order:

“100 No. 11, 16x226 Needles.”

The best results will be obtained by using the needles furnished by the Singer Sewing Machine Company.

Thread

Left twist thread should be used in the needle. Either right or left twist can be used in the bobbin.

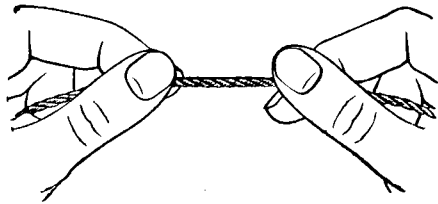


Fig. 2. How to Determine the Twist

Hold the thread as shown above. Turn the thread over toward you between the thumb and forefinger of the right hand; if left twist, the strands will wind tighter; if right twist, the strands will unwind.

To Remove the Bobbin

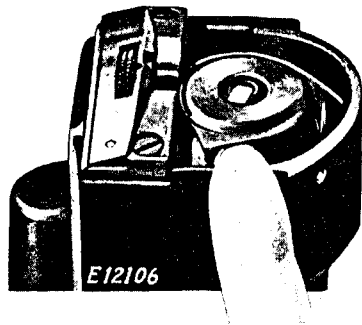


Fig. 3. Removing the Bobbin Case Cap

Draw out the slide plate on the top of the post. Turn the balance wheel over toward you until the needle bar moves up to its highest point. Place the thumb or finger under the projection on the side of the bobbin case as shown in Fig. 3, lift out the cap and remove the bobbin.

To Wind the Bobbin

(See Fig. 4)

Fasten the bobbin winder to the table with its driving pulley in front of the machine belt, so that the pulley will drop away from the belt when sufficient thread has been wound upon the bobbin.

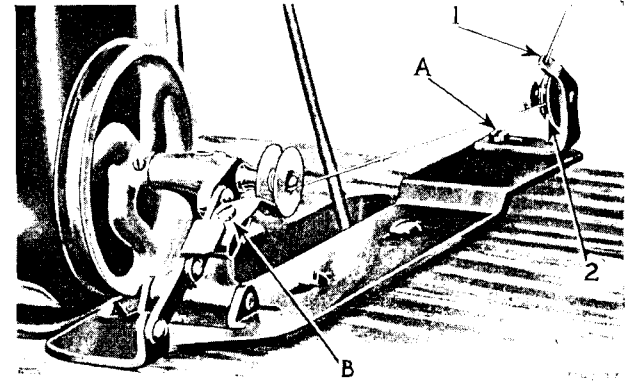


Fig. 4. Winding the Bobbin

Place the bobbin on the bobbin winder spindle and push it on as far as it will go.

Pass the thread down through the thread guide (1) in the tension bracket, around the back and between the tension discs (2). Then wind the end of the thread around the bobbin a few times, push the bobbin winder pulley over against the machine belt, and start the machine.

When sufficient thread has been wound upon the bobbin, the bobbin winder will stop automatically.

If the thread does not wind evenly on the bobbin, loosen the screw (A) in the tension bracket and move the bracket to the right or left, as may be required, then tighten the screw.

The amount of thread wound on the bobbin is regulated by the screw (B). To wind more thread on the bobbin, turn the screw (B) inwardly. To wind less thread on the bobbin, turn this screw outwardly.

Bobbins can be wound while the machine is stitching.

To Thread the Bobbin Case Cap

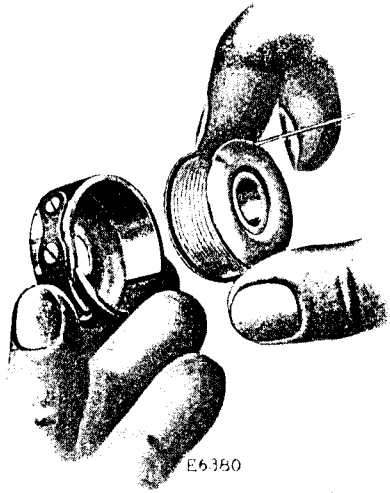


Fig. 5

With the left hand hold the bobbin case cap as illustrated (see Fig. 5), and place the bobbin into it.

Hold the bobbin between the thumb and forefinger of the right hand, the thread drawing on top from the left toward the right.

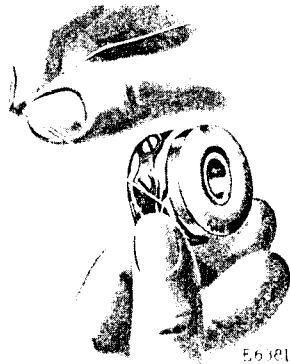


Fig. 6

Then pull the thread into the slot in the edge of the bobbin case cap (see Fig. 6), and under the tension spring as shown in Fig. 7.

To ensure the correct tension, draw the thread under the tension spring once or twice; this will remove any lint which may become lodged under the spring.



Fig. 7

To Replace the Bobbin Case Cap

After threading, take the bobbin case cap in the right hand, holding the bobbin in the cap with the forefinger, and place it on

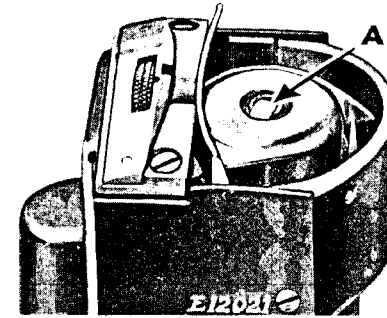


Fig. 8. Bobbin Case Cap Threaded and Replaced

the centre stud of the bobbin case base, then push down the latch (A, Fig. 8), having the thread at the left of the projection as shown in Fig. 8, and replace the slide plate.

To Set the Needle

Turn the balance wheel over toward you until the needle bar moves up to its highest point, loosen the set screw in the lower end of the needle bar and put the needle up into the needle bar as far as it will go, with the long groove of the needle toward the left and the eye directly in line with the arm of the machine, then tighten the set screw.

To Adjust the Thread Lubricator

To ensure satisfactory results, Singer Thread Lubricant should be used in the thread lubricator which is attached to the face plate.

When replenishing the lubricant supply, fill the reservoir (A, Fig. 9) to about $\frac{1}{4}$ inch below the filler hole (B, Fig. 9).

The amount of lubrication of the thread is controlled by raising or lowering the felt pad holder (12, Fig. 9) above or below the level of the lubricant. For more lubricant, lower the felt pad holder. For less lubricant, raise the felt pad holder.

Upper Threading

(See Fig. 9)

Pass the thread from the unwinder from right to left through the lower hole (1) in the pin on top of the machine, and from

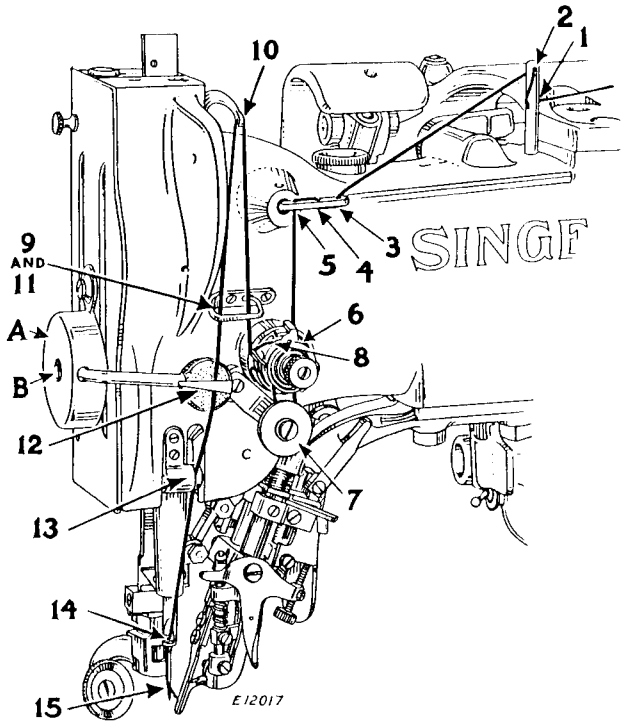


Fig. 9. Upper Threading

front to back through the upper hole (2) in the pin, down through the hole (3) in the thread guide at the front of the machine, up through the hole (4) in the thread guide and down through the hole (5) in the thread guide, down between the tension discs (6), down under and from right to left into the thread roller (7), up into the fork (8) above the tension discs, against the pressure of the wire controller spring, up through the thread guide (9), up and from right to left through the hole (10) in the end of the thread take-up lever, down through the guide (11), between the felt pad and felt pad retainer finger (12), through the thread retainer (13), through the hole (14) in the lower end of the needle bar, and from left to right through the eye of the needle (15). Draw about three inches of thread through the eye of the needle.

To Prepare for Sewing

With the left hand, hold the end of the needle thread, leaving it slack from the hand to the needle, turn the balance wheel over toward you until the needle moves down and up again to its highest point, thus catching the bobbin thread; draw up the needle thread and the bobbin thread will come with it through the hole in the throat plate. Lay the threads back under the roller presser.

To Commence Sewing

Place the material beneath the roller presser, lower the roller presser and commence to sew, turning the balance wheel over toward you.

To Remove the Work

Stop the machine with the thread take-up lever at its highest point, raise the roller presser, draw the work back and cut the threads close to the leather.

To Regulate the Pressure on the Material

The pressure on the material is regulated by the hexagon screw (B, Fig. 18) at the back of the machine, the screw acting on a flat spring. To increase the pressure, turn the screw downwardly. To decrease the pressure, turn the screw upwardly.

Tensions

The needle and bobbin threads should be locked in the centre of the thickness of the material, thus:



Fig. 10. Perfect Stitch

If the tension on the needle thread is too tight, or if that on the bobbin thread is too loose, the needle thread will lie straight along the upper surface of the material, thus:



Fig. 11. Tight Needle Thread Tension

If the tension on the bobbin thread is too tight, or if that on the needle thread is too loose, the bobbin thread will lie straight along the under side of the material, thus:



Fig. 12. Loose Needle Thread Tension

To Regulate the Tensions

The tension on the needle thread is regulated by the thumb nut (A, Fig. 17) at the front of the tension discs on the front of the machine. To increase the tension, turn this thumb nut over to the right. To decrease the tension, turn the thumb nut over to the left.

The tension on the bobbin thread is regulated by means of the screw nearest the centre of the tension spring on the outside of the bobbin case cap.

Feed Gears for Machine 136w110 and Number of Stitches Produced Per Inch

Gear	Pinion	Stitches Per Inch
249020	249034	12
249021	249035	13
249022	249036	14
249023	249037	15
249024	249038	16
249025	249039	17
249026	249040	18
249027	249041	19
249028	249042	20
238641	238655	21
249029	249043	23
238642	238656	24
238605	238618	26
238606	238619	29
238607	238620	32

Machine 136w110 is regularly fitted to make 19, 21 and 23 stitches to the inch.

Any three sets of gears, as listed above, will be furnished in place of the regular gears, without additional charge, when so specified on the order.

Extra gears may be purchased.

Caution: When changing the feed gears, care must be taken to see that the gears to be used are correctly paired for each length of stitch according to the numbers given in the above list.

To Change the Length of Stitch

The three pairs of feed gears are located at the left underneath the bed of the machine, each pair of gears making a different length of stitch. The location of the knurled collar (B, Fig. 13) on its shaft determines which pair of gears is engaged. When the knurled collar (B) is at the outer end of its shaft, the outermost pair of gears (F, Fig. 14) is engaged. When the knurled collar (B) is in the central position on its shaft, the middle pair of gears is engaged. When the knurled collar (B) is set at

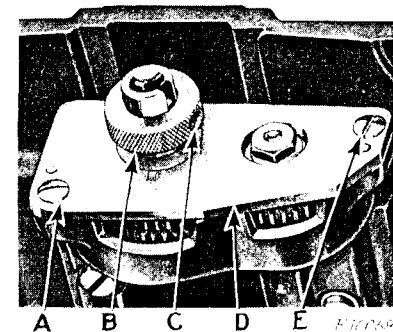


Fig. 13. Adjustment for Changing Length of Stitch

the innermost position on its shaft, the innermost pair of gears is engaged.

To change the length of stitch, raise the roller presser, then slide the knurled collar (B) to the desired position on the shaft and turn it in either direction until the engaging latch (G, Fig. 14) enters the notch in the gear.

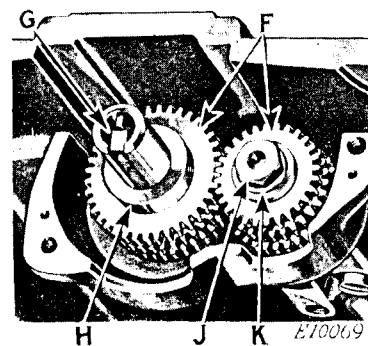


Fig. 14. Stitch Regulating Gears

To Limit the Machine to Making but One or Two Lengths of Stitches

When it is desired to limit the machine to making but one or two lengths of stitches, the spacing washers (L, Fig. 15) should be substituted for the feed driving pinions as instructed below:

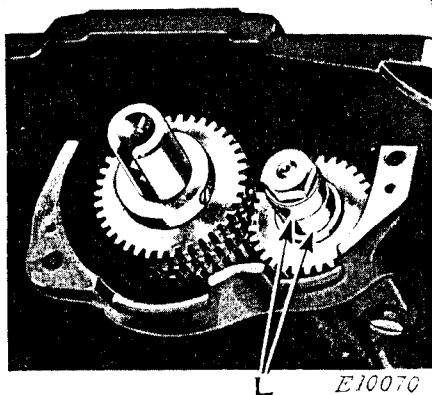


Fig. 15. Showing Spacing Washers in Position in Machine

Loosen the set screw (C, Fig. 13) and remove the knurled collar (B, Fig. 13). Take out the two screws (A and E, Fig. 13) and remove the cover plate (D, Fig. 13). Then loosen the set screw and remove the collar (H, Fig. 14), engaging latch (G, Fig. 14), nut (J, Fig. 14) and washer (K, Fig. 14).

As the largest of the three feed driving pinions is placed innermost on the shaft, it will be necessary to remove two of the feed driving gears in order to remove the three pinions. When removing the gears it will be noted that there are two separating washers on the shaft. These washers must be placed one between the first and second gears and one between the second and third gears, when the gears are replaced.

When replacing the gears, place the medium size gear on the shaft and the largest of the gears on the outside, at the same time replacing the pinion for making the desired length of stitch so that it meshes with its corresponding gear and setting the spacing washers (L, Fig. 15) opposite the gears which are to be disengaged. Then replace the engaging latch (G, Fig. 14), collar (H, Fig. 14) and washer (K, Fig. 14) and securely tighten the nut (J, Fig. 14). Replace the cover plate (D, Fig. 13) at the left of the gears, also replace the knurled collar (B, Fig. 13) and tighten the set screw (C, Fig. 13).

To Regulate the Amount of Travel of the Needle Bar

When the stitch regulating gears have been changed to produce a different length of stitch, the throw or amount of travel

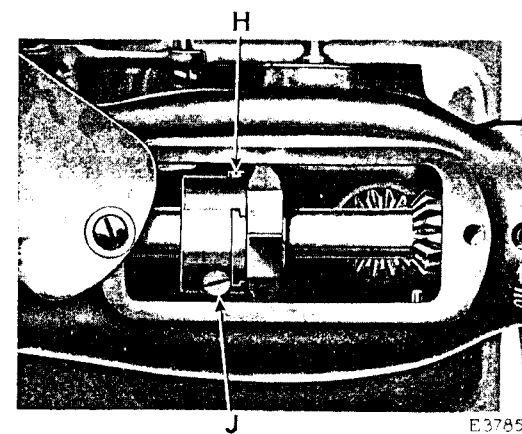


Fig. 16. Adjustment for Regulating Amount of Travel of the Needle Bar

of the needle bar must also be changed, so that the needle will move forward in unison with the wheel feed for each stitch. When the variation between the three lengths of stitches the machine is set to make is not too great, the amount of travel of the needle bar should be adjusted to correspond with the middle length of stitch, this will automatically take care of the shorter and longer stitches which the machine will make.

Swing back the cover plate at the top of the machine and loosen the screw (H, Fig. 16) in the needle bar driving eccentric on the arm shaft. To increase the throw or amount of travel of the needle bar for a longer stitch, turn the large screw (J, Fig. 16) on the needle bar driving eccentric over to the left or upwardly. To decrease the throw of the needle bar for a shorter stitch, turn the large screw (J) over to the right or downwardly. When the required throw of the needle bar is obtained, firmly tighten the screw (H).

To Oil the Machine

To ensure easy running and prevent unnecessary wear of the parts which are in movable contact, the machine requires oiling, and when in continuous use, it should be oiled at least twice each day.

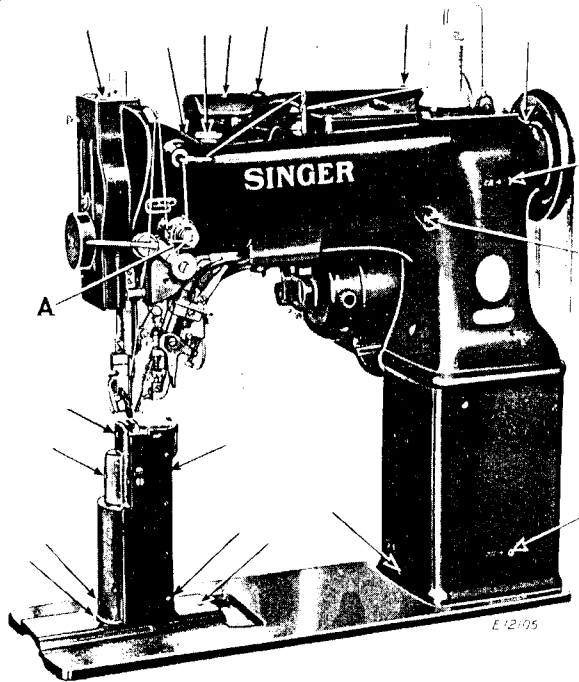


Fig. 17. Front View of Machine, Showing Oiling Points

The places where the machine should be oiled are indicated in Figs. 17, 18, 19, 20 and 24, by arrows pointing to the oil holes and bearings.

Oil the bobbin case bearing in the hook race, through the oil hole shown in Fig. 24, each time a bobbin is replaced.

Swing back the cover at the top of the machine, as shown in Fig. 16, and apply oil to the gears and needle bar driving eccentric thus uncovered.

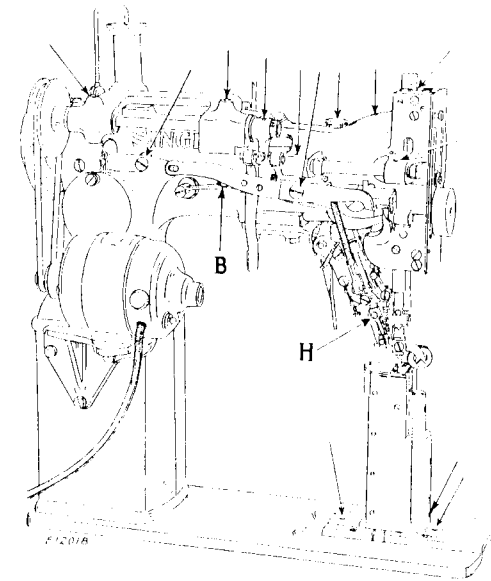


Fig. 18. Back View of Machine, Showing Oiling Points

Occasionally remove the cover (F, Fig. 19) and the screw (C, Fig. 19) of the gear cases on the underside of the bed of the

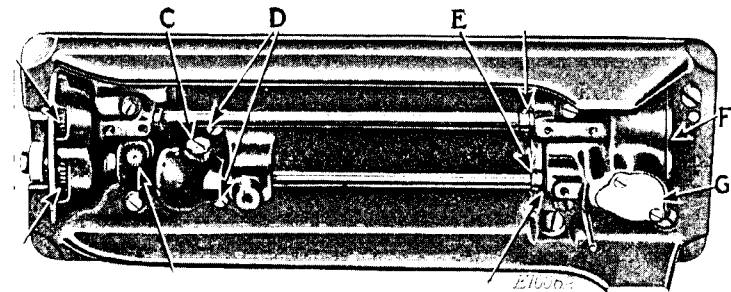


Fig. 19. Base View of Machine, Showing Oiling Points

machine and fill the gear cases with Singer High Speed Lubricant, a grease which is especially prepared for the purpose. When removing the cover (F) be careful not to damage the paper gasket under the cover. If this gasket is torn, the grease will leak out of the gear case when the cover is replaced.

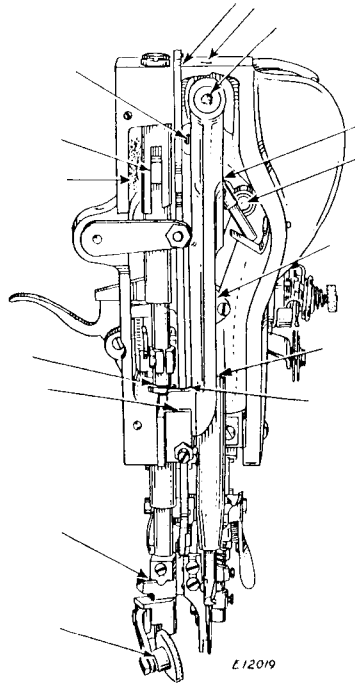


Fig. 20. End View of Machine,
Showing Oiling Points

Loosen the thumb screw in the upper end of the face plate, pull out the lower end of the face plate over the position pin, swing up the plate and tighten the thumb screw. Oil the wicks and bearings which are thus uncovered, as shown in Fig. 20, then replace the face plate and tighten the thumb screw.

To Lubricate the Trimmer Motor

The ball bearings in the trimmer motor have enough grease for about 2000 hours of operation. At the end of this period and each 2000 hours thereafter, the end covers of the motor should be removed and the bearings cleaned with kerosene and repacked with Singer Ball Bearing Lubricant.

Caution: Do not run the motor without load as it will reach an excessive speed.

To Operate the Trimmer

The trimmer motor is started or stopped by means of the toggle switch (V, Fig. 21) on the motor. It is advisable to start the motor with the trimmer knife thrown out of action, but the motor should not be allowed to run for long periods when the trimmer is not in use.

To throw the knife **out of action**, press the lever (W, Fig. 21) to the left. To throw the knife **into action**, move the handle (S, Fig. 21) to the right.

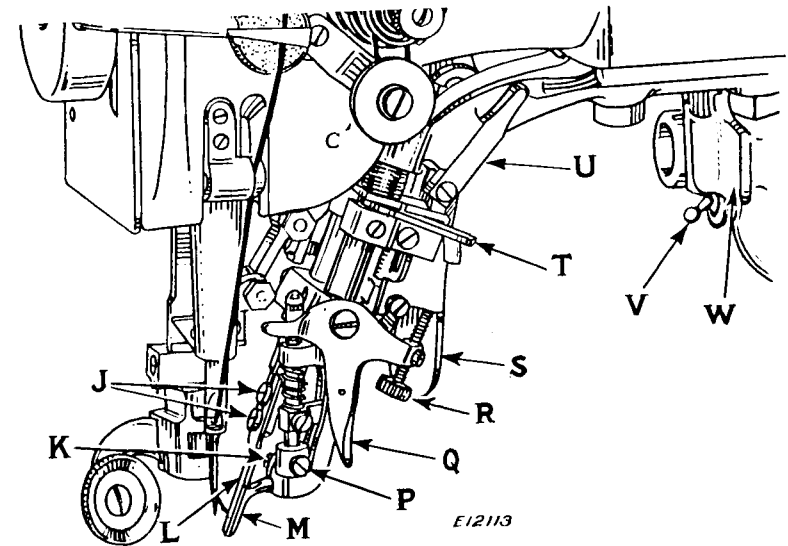


Fig. 21. Adjustments on the Trimmer

The knife (L, Fig. 21) is held obliquely in the correct position for cutting the linings smoothly and rapidly from under the bead edge of the uppers, and may be thrown into or out of action as desired, while the stitching is in progress.

To Adjust the Edge Guide Finger

The purpose of the edge guide finger (M, Fig. 21) is to keep the edge of the shoe upper out of range of the trimming knife, thus preventing the knife from cutting the edge of the upper while the stitching and trimming is in progress. When in proper adjustment the edge guide finger should be slightly to the left of the knife (L). The sidewise adjustment of the edge guide finger is obtained by loosening the screw (K, Fig. 21) and moving the guide finger holder to the right or left as may be required, after

which the screw (K) should be firmly tightened. The back edge of the guide finger should stand as close to the knife as possible without striking it; this adjustment is obtained by loosening the screw (P, Fig. 21) and moving the guide finger backward or forward as may be required. The guide finger should be adjusted to a height that will permit the facing or lining to pass freely under it to the knife while protecting the edge of the upper from injury. The guide finger can be adjusted to the correct height by means of the screw (R, Fig. 21). If the guide finger should run under or catch the lining, the guide finger holder should be slightly raised. To hold the guide finger out of action, hang up the guide finger bar by means of the latch (U, Fig. 21).

When crossing heel seams, it is sometimes desirable to slightly raise the edge guide finger (M, Fig. 21). To do this, press the lever (Q, Fig. 21) to the left and hold it in this position until the seam is crossed.

When it is desired to use the edge guide (M) with the knife out of action, move the lever (T, Fig. 21) to the left. When it is desired to automatically raise the edge guide finger with the knife, move the lever (T) to the right when the knife is down.

To Sharpen the Knife

When it is necessary to resharpen the knife (L, Fig. 21), loosen the two screws which fasten the knife to the knife holder and remove the knife. Knife grinder 207032 should be used to sharpen the knife. As one grinder can be used for several machines, it should be ordered separately.

Sharpen the cutting edge of the knife on the beveled side only, and grind off as much from the projection as from the cutting edge so as to maintain their relative proportions, and to prevent the projection from striking the hook.

Oil should be regularly applied to the two ball oilers indicated by the arrows in Fig. 22.

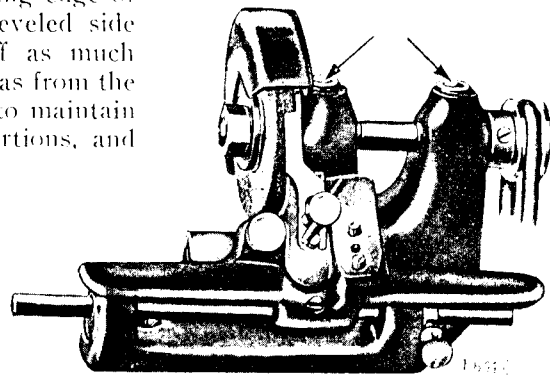


Fig. 22. Knife Grinder 207032

To Change the Trimming Margin

The knife descends obliquely and must be set so that the cutting edge will press against and pass just below the cutting edge of the throat plate to ensure making a shear cut.

There are two positions on the knife holder for the knife: one holds the knife while trimming back of the needle, which is necessary when the trimming margin is less than .040 inch and the other holds it while trimming abreast of the needle, for a trimming margin of .040 inch or more.

If the position of the knife is altered from trimming abreast to back of the needle or vice versa, a throat plate that will receive the knife in its new location must be substituted for the one in the machine, and a change of guide fingers must also be made to protect the bead edge of the shoe upper from injury.

Each throat plate has but one trimming margin. For trimming back of the needle the trimming margin may be .015, .025, .035 or .050 inch from the seam, and for trimming abreast of the needle the trimming margin may be .040, .050, .060 or .075 inch from the seam.

The trimming margin is measured from the centre of the needle hole to the cutting edge of the throat plate, which cannot have a large needle hole and a narrow trimming margin.

The sidewise adjustment of the knife is obtained by loosening the lock screw (H, Fig. 20) at the back of the knife bar and moving the knife holder to the right or left as may be required, after which the lock screw (H) should be firmly tightened.

The knife can be adjusted to the correct height by loosening the two screws (J, Fig. 21) and moving the knife (L, Fig. 21) up or down on the knife holder, after which the two screws (J) should be securely tightened.

INSTRUCTIONS FOR ADJUSTERS AND MACHINISTS

Thread Controller

The function of the thread controller spring is to hold back the slack of the needle thread until the eye of the needle nearly reaches the goods in its descent, as without this controlling action of the spring, the slack thread or silk (more especially silk) will sometimes be penetrated by the point of the needle as the needle is descending.

For more controller action on the thread, loosen the stop screw (N, Fig. 23) at the right of the tension and set the stop lower, and for less action set the stop higher, then tighten the stop screw (N).

To strengthen the action of the controller spring on the thread, loosen the tension stud screw (O, Fig. 23) at the right of the stop screw and turn the tension stud slightly to the left with a screw-driver, or to lighten its action, turn to the right and tighten the tension stud screw (O).

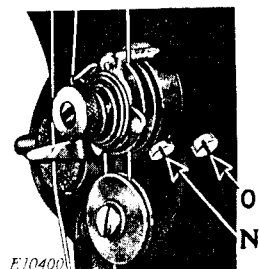


Fig. 23. Adjustments on Thread Controller

To Set the Needle Bar

See that the needle is up in the bar as far as it will go. There are two lines across the needle bar about two inches above the lower end. When the needle bar is at its lowest position, the upper mark should just be visible at the end of the needle bar frame.

In case the needle bar is not set at the correct height, loosen the needle bar connecting stud pinch screw and place the needle bar in the correct position as instructed above, then tighten the screw.

To Set a Needle Bar which has no Mark. Set the needle bar so that when it rises $\frac{3}{32}$ inch from its lowest position, the point of the sewing hook will be at the centre of the needle and about $\frac{1}{16}$ inch above the eye.

To Change the Forward and Backward Position of the Needle Bar. Raise the round cover plate at the back of the machine and loosen the large screw thus brought to view. While this screw is loose, the needle bar can be moved forward or backward as required, to bring the needle in the desired position in the throat plate needle hole, after which securely tighten the large screw and replace the cover plate.

To Time the Sewing Hook

Remove the throat plate and turn the balance wheel over toward you until the lower mark across the needle bar is just visible at the end of the needle bar frame on the upward stroke of the needle bar. If the needle bar and sewing hook are correctly timed, the point of the hook will be at the centre of the needle and about $\frac{1}{16}$ inch above the eye.

In case the sewing hook is not correctly timed, remove the screw (C, Fig. 19) and loosen the two set screws in the hook driving gear thus uncovered, then turn the balance wheel over toward you until the needle bar has descended to its lowest point and has risen until the lower timing mark across the needle bar is just visible at the end of the needle bar frame. Now turn the sewing hook until the point of the hook is at the centre of the needle, after which securely tighten the two set screws in the hook driving gear and replace the screw (C).

To Set the Sewing Hook to or from the Needle

To prevent the point of the sewing hook from dividing the strands of the thread, it should run as close to the needle (within the scarf) as possible.

Remove the gear case cover (G, Fig. 19) and loosen the two screws in the hook shaft spiral driving gear thus uncovered, also loosen the screws in the collar (E, Fig. 19), then loosen the two screws (D, Fig. 19) and move the hook saddle toward or away from the needle, as required, after which securely tighten the two screws (D, Fig. 19), then move the collar (E, Fig. 19) over against the bushing and tighten its set screws. Tighten the two screws in the hook shaft spiral driving gear and at the same time hold the shaft to the right and the spiral gear to the left to eliminate any end play in the hook driving shaft.

To Remove the Sewing Hook from the Machine

Remove the hook gib screws and remove the gib (H, Fig. 24) to allow the base of the bobbin case to be taken out, after which remove the screw from the centre of the hook. Tapping the hook slightly on the bottom of its rim will force it from its socket. Do not try to pry it out, as prying may bend the shank of the hook. In replacing the hook, be sure that the prongs of the shank properly enter the slot at the bottom of the socket, otherwise the hook will be out of time.

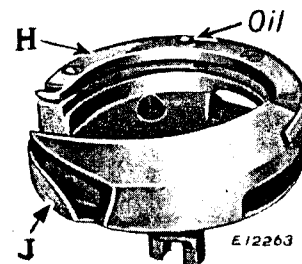


Fig. 24. Hook Showing Oiling Wick and Hook Washer (Needle Guard)

Needle Guard

The function of the hook washer (J, Fig. 24) (which is attached to the bottom of the sewing hook) is to prevent the point of the hook from striking the needle, if, when passing through the material, the needle is deflected towards the hook.

The upright portion of the hook washer should be sprung with a screwdriver or other instrument until it prevents the hook point from striking the needle. It should not, however, be sprung outwardly enough to deflect the needle from its normal path.

To Remove the Needle Bar Rock Frame Rock Shaft

Remove the face plate and needle bar rock frame, then raise the round cover plate at the back of the machine and loosen the large screw thus brought to view. The needle bar rock frame rock shaft can then be withdrawn from the machine.

To Raise or Lower the Feed Wheel

The height of the feed wheel is regulated by the eccentric stud (D, Fig. 25). To raise or lower the feed wheel, loosen the set

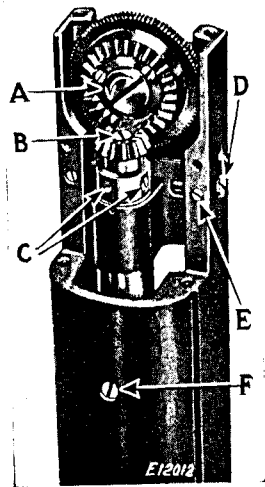


Fig. 25

screw (F, Fig. 25) and turn the eccentric stud (D) to the right or left a fraction of a turn until the feed wheel is at the desired height, then securely tighten the set screw (F).

The feed wheel should be set as low as possible and still feed the work satisfactorily.

To Remove Feed Wheel

Remove feed wheel cover and throat plate. Loosen the two set screws (C, Fig. 25) in the pinion gear, then remove the screw studs (A and B), both of which have left-hand threads and must be turned to the right to remove. The pinion and feed wheel may then be removed.

When replacing the pinion gear, be sure that the thrust washer is under it before inserting the screw stud (B). After stud (B) is tightened, turn the pinion until one of the set screws (C) is opposite the flat on the stud, and securely tighten both set screws.