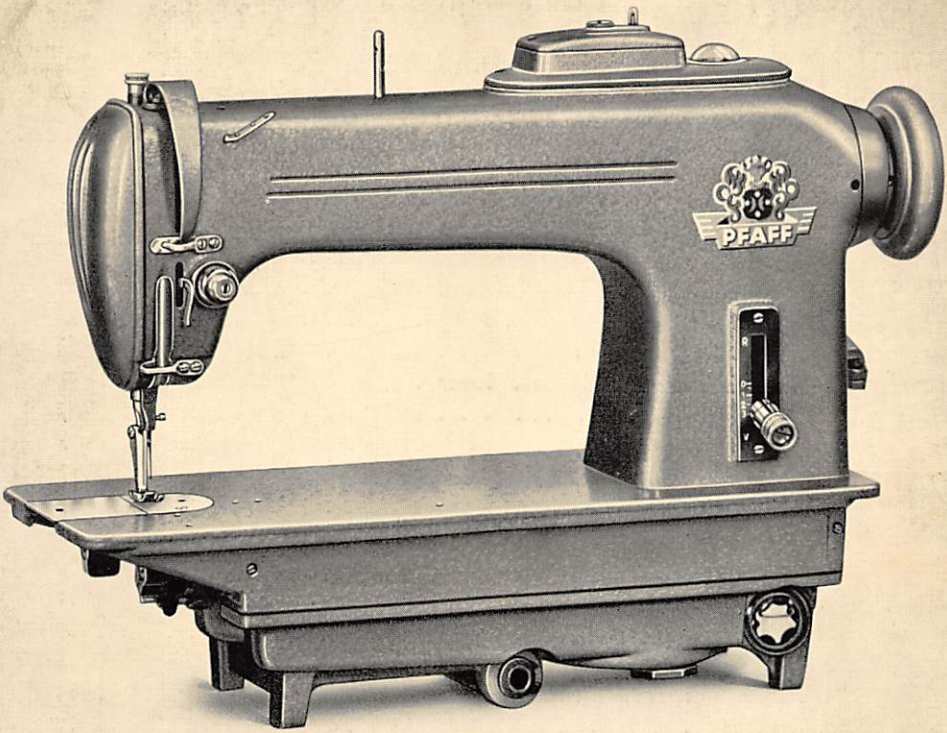

PFAFF 436

One Needle Lockstitch Superspeed Sewer

with Automatic Lubrication

INSTRUCTION BOOK

G. M. PFAFF AG, Sewing Machine Factory, KAISERSLAUTERN

Index

Instruction Book

PFAFF 436

One Needle Lookstitch Superspeed Sewer with Automatic Lubrication

This Instruction Book contains useful instructions for operators and mechanics alike and therefore should be made available to both rather than put away in your files.

PFAFF 436

Brief Description of the Machine

The PFAFF 436 One Needle Lockstitch Superspeed Sewing Machine, fitted with link take-up and horizontal rotary hook, in its mechanical set-up may be regarded as an improved model of the PFAFF 134. The high sewing speed of this machine, ranging from 4,000 to 5,000 stitches per minute depending on the grade of material sewn, has made it mandatory that it be provided with a forced feed lubrication system.

Since the manipulations required for this machine, such as for threading the needle, regulating the length of stitch, and tying off seams, have not been changed, operators need not be retrained and expenses for such re-training are eliminated.

With its modern, functional design, sturdy construction, and its sewing properties of highest perfection, this machine satisfies any demand in all branches of the sewing industry.

Varieties of the PFAFF 436

The PFAFF 436 is available in the following three varieties:

Model	Class of Work	Maximum Length of Stitch (Stitches p. Inch)	Maximum Speed (Stitches per Minute)	Needle System	Presser Foot Clearence
A	Sheer, light-weight fabrics	7	5,000	133 R	$^{11}/_{64}$"
B	Medium weight fabrics	6	4,800	134 R	$^{9}/_{32}$"
C	Medium heavy fabrics	$5^{1}/_{2}$	4,500	134 R	$^{5}/_{16}$"

The above models of the PFAFF 436 differ in regard to the maximum length of stitch, the needle bar rise, the presser foot clearance, and the take-up motion, and thereby are particularly adapted to the class of work they are intended for.

1. Setting Up the Machine

In most instances the PFAFF 436 is fitted for individual power drive to be set up on an individual power table.

The machine is driven by a $^{1}/_{2}$ HP motor, friction clutch type. (Type of current and tension optional to suit local requirements).

Power is transmitted from the motor to the sewing machine by means of a V-belt, $^{25}/_{64}$" wide (DIN 2215).

For 50 cycle current, a motor performing 2,800 R.P.M. should be used, whereas for 60 cycle current, a motor performing 3,400 R.P.M. would be appropriate.

The motor pulley can easily be exchanged to alter the maximum number of stitches per minute of the machine.

The below table should be consulted for all data regarding the maximum number of stitches obtainable in relation to the various motor pulley diameters.

Diameter of Balance Wheel	50 Cycles		60 Cycles	
	Diameter of Motor Pulley	Stitches per Minute	Diameter of Motor Pulley	Stitches per Minute
$2\,^{33}/_{64}$" (64 mm)	$3\,^{47}/_{64}$" (95 mm)	4,200	$3\,^{5}/_{32}$" (80 mm)	4,200
	$3\,^{15}/_{16}$" (100 mm)	4,400	$3\,^{11}/_{32}$" (85 mm)	4,500
	$4\,^{11}/_{64}$" (106 mm)	4,600	$3\,^{35}/_{64}$" (90 mm)	4,800
	$4\,^{13}/_{32}$" (112 mm)	4,800	$3\,^{47}/_{64}$" (95 mm)	5,000
	$4\,^{41}/_{64}$" (118 mm)	5,100	$3\,^{15}/_{16}$" (100 mm)	5,300

Head and stand are packed separately. The head should be unpacked very carefully to avoid damage. After taking off the lid of the box, unscrew the wood screws holding the cushioned wooden blocks supporting the machine head inside the box. Take the head out carefully, remove the dust thoroughly, and set it up on the rubber pads on the table. To facilitate mounting the rubber V-belt, place the belt on the machine pulley, lift up the motor somewhat, and then pull the belt on the motor pulley. Setting the V-belt tension is instructed in Section 20.

The machine is dispatched without oil filling in the oil reservoirs and must not be run while in this condition!

2. Filling In the Oil

The amount of oil required for the first two fillings comes with the machine in a can. It is a spindle oil, viscosity 3.2° Engler at 20° C, which has proved very satisfactory for the lubrication of the PFAFF 436. To fill

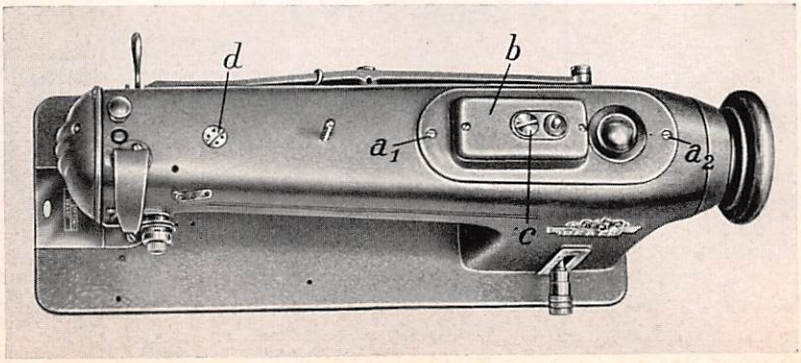

Photo 1

in the oil, proceed as follows: Remove screw **d** (Photo 1), fill in about 1 pint (0.5 l) of oil, and wait a few minutes until it has accumulated in the oil reservoir. Now check at the oil level gauge in the front of the oil reservoir (Photo 2) if the amount of oil filled in is sufficient. The oil level should be between the two marks indicating the maximum and minimum levels of 0.6 and 0.3 l respectively with the machine being idle. Under no circumstances should the top cover be removed and oil be filled in there. Experience has shown that it is of advantage to lubricate the hook separately. Oil reservoir **b** serving this purpose is on top of the machine arm (Photo 1). To fill up the hook oil, remove screw **c**, and fill in approximately 4.5—4.9 cu. in. (75—80 cm^3) of oil. **As long as the red point of the float spindle is visible in the oil level tube while the machine is in operation, there is sufficient oil in the reservoir. If, however, the red point of the float spindle is flush with the top surface of the oil sealer nut, oil should be filled up.**

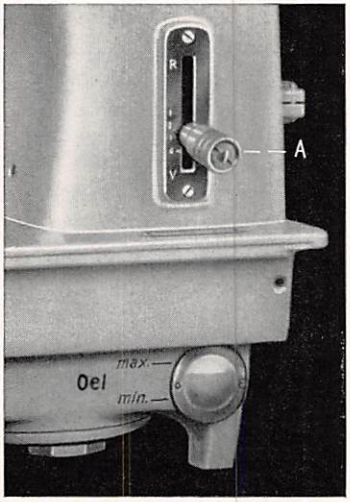

Photo 2

3. Testing the Machine

It is recommended to test-run the machine with thread and bobbin case removed. First of all, however, **make sure that the line voltage corresponds with the voltage given on the rating plate of the motor, and that the machine pulley rotates in the proper direction,** i. e. toward the operator. Never must the motor rotate in reverse direction. Therefore, before running the machine, cut in the motor, hold the balance wheel with your right hand, tip on the treadle, and make sure by the jerk of the balance wheel that it rotates in the proper direction. If not, simply exchange the two motor terminals. Now press down the treadle and, while running the machine, check at the oil gauge dome on the top of the machine arm if the pump works correctly (indicator cap in top position).

For regulating the hook lubrication system, see Section 23.

Note: Never run the machine unless a piece of fabric is inserted under the presser foot or the latter is raised.

4. Taking Out the Bobbin Case Cover

Raise the thread take-up to its highest position, open the bobbin case latch with the thumb nail of your left hand, and, by means of this latch, pull the bobbin case cover out as shown in photo 3.

Note: As long as the latch is open, the bobbin cannot fall out of the bobbin case.

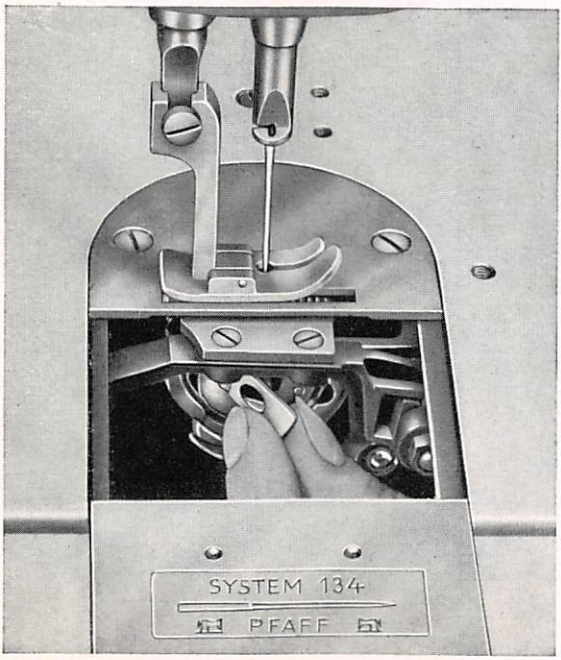

Photo 3

5. Winding the Bobbin

For this operation the bobbin winder for power drive (Photo 4) is used which features a number of improvements.

The bobbin winder spindle runs in a sintered steel bushing making lubrication of the winder completely superfluous.

To reduce the high speed somewhat, the diameter of the bobbin winder pulley has been increased to $3\,^{15}/_{16}$".

The rim of the pulley was given a V-shaped profile so as to make the concave bottom surface of the V-belt fit on it well. If necessary, even a round belt can be used.

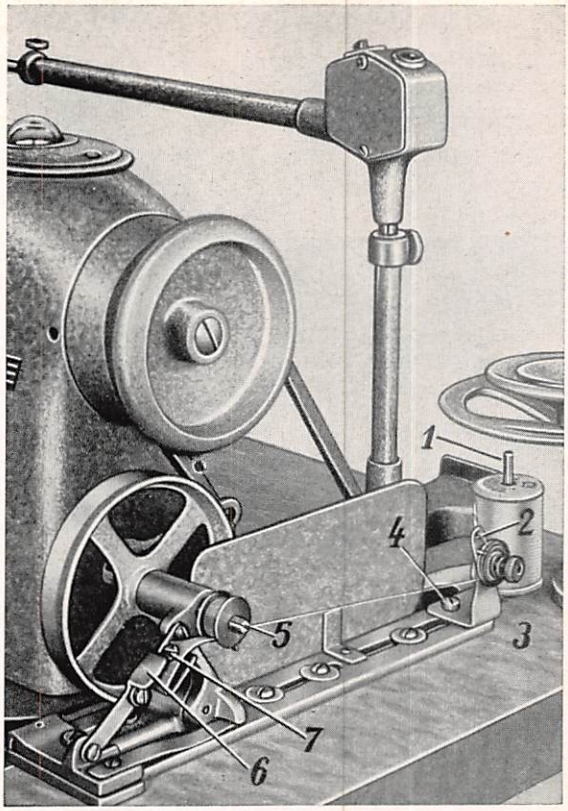

Photo 4

Fasten the bobbin winder to the table with its driving pulley far enough from the machine belt so that it will not touch the belt when the winder is disengaged. A windshield mounted on the winder base prevents the thread from being dragged over toward the belt by the suction. An adjustable leather pad mounted on the base serves to stop the winder silently.

Pass the thread from the spool 1 through eyelet 2, clockwise around and between the tension discs 3, to the bobbin. Now pass the end of the thread inside-out through the slot in the face of the bobbin, place the latter on the bobbin winder spindle 5, and hold the loose end of thread until the winder has made a few revolutions. Start the winder by pressing down the flap of engaging lever 6. When sufficient thread has been wound on the bobbin, the winder will stop automatically. The amount of thread to be wound on the bobbin is regulated by screw 7.

Turning it right—More thread
Turning it left —Less thread

6. Threading the Bobbin Case

Insert the full bobbin into the bobbin case cover so that the thread unwinds clockwise (Photo 5).

Pull the thread into the slot 1, and draw it under the tension spring into the delivery eye 2. Place the bobbin case cover with the bobbin on the center stud in the bobbin case base so that the bobbin case latch points toward the operator. Press the bobbin case in until it clicks in position audibly. This is very important as otherwise needle or bobbin case breakage may result.

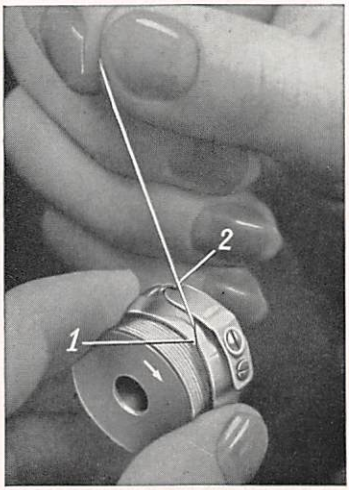

Photo 5

7. Threading the Needle

Threading the PFAFF 436 presents no difficulty since the thread, as with PFAFF 133/134 machines, passes in plain view of the operator (Photo 6) so that every user should be familiar with it. Pass the thread from the thread unwinder to thread guide pin 1 and, to prevent vibration of the thread at high speed, through both of its holes. By the same token, pass it through all three holes in the thread retainer 2 as shown in photo 6, and then between tension discs 3, to thread check spring 4, below guide 5, through guide 6, right-left through the take-up eyelet 7, down to thread guide 8 and needle bar eyelet 9, and left-right through the needle eye 10.

8. Drawing Up the Bobbin Thread

Hold the end of the needle thread, and turn the balance wheel toward you until the needle moves down and up again, thus catching the bobbin thread which comes up through the needle hole in a loop (Photo 7). Place both threads back under the presser foot.

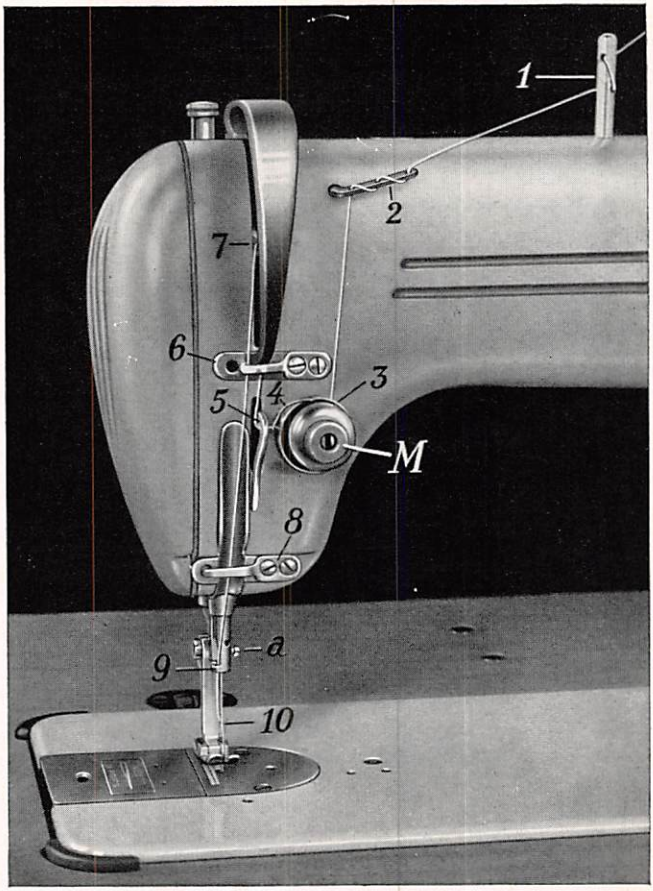

Photo 6

Basic Rule: Stop the machine or commence sewing only with the take-up in its highest position.

This precaution should always be taken to prevent jamming of the thread in the hook race, or slipping out of the needle eye. In this case it is not necessary to hold the needle and bobbin threads when commencing to sew.

9. Regulating the Thread Tensions

To obtain a perfect seam, observe the following points:

The needle and bobbin threads should be locked in the center of the material as shown in Fig. 8.

Turning the tension nut **M** clockwise makes the **needle thread tension** tighter; turning it counter-clockwise will make it looser (Photo 6).

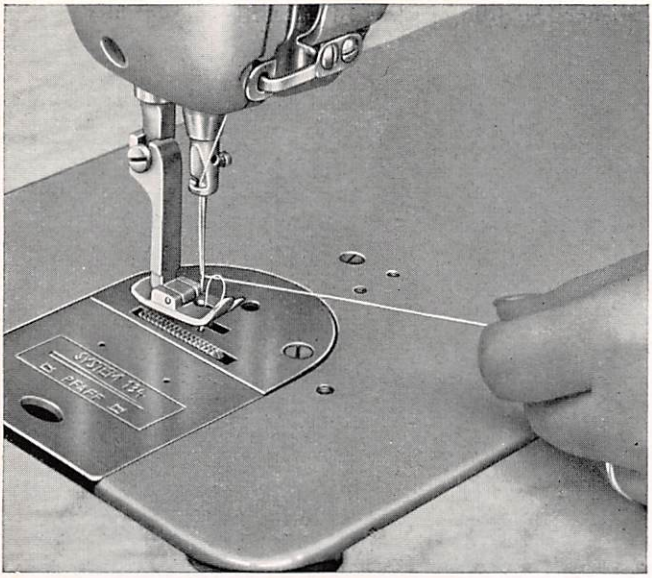

Photo 7

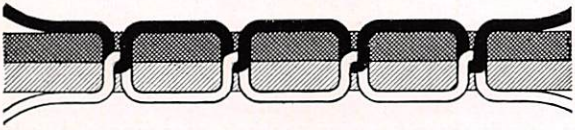

Fig. 8

The **bobbin thread tension** is regulated by means of the small hook screw driver. Turning tension screw **z** clockwise makes the tension tighter; and turning it counter-clockwise, looser (Fig. 9).

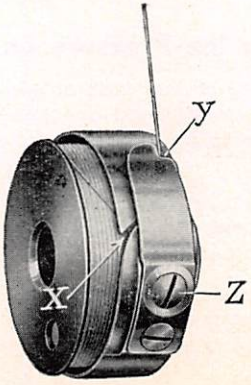

Fig. 9

The tensions should be regulated in accordance with the material used and so as to obtain tightly set stitches forming a nice and straight seam, without puckering the material.

For this purpose the grade of thread used plays a decisive role.

Thus, for sheer fabrics a thin and soft thread should be used. Stiff and resistant thread due to its low elasticity is unfit for practically any fabric. To properly regulate the thread tensions requires some experience until one can tell whether the needle thread tension is too tight or the bobbin thread tension too loose as shown in Fig. 10.

In Fig. 11, the needle thread tension may be too loose or the bobbin thread tension too tight.

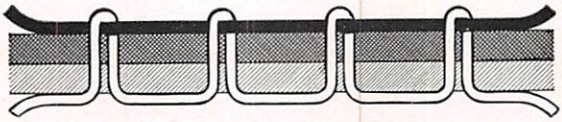

Fig. 10

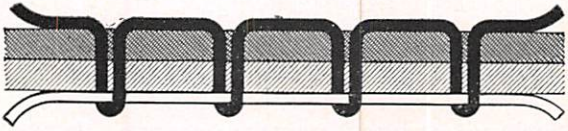

Fig. 11

The operator will have to decide in any particular case if either the needle or the bobbin thread tension requires appropriate adjustment, particularly if the thread forms small knots or loops on the upper or underside of the fabric.

Note: The needle thread tension can only be adjusted with the presser bar lowered as raising the presser bar automatically releases the tension.

10. Regulating the Pressure on the Material

Smooth and even feeding of the work as well as preventing chafing of the material by the teeth of the feed dog depend on the setting of the proper amount of pressure to be exerted on the material by the presser foot.

Turning presser bar adjusting cap screw **V** (Photo 20) inwardly will increase the pressure for heavier materials; turning it outwardly will ease the pressure for lightweight materials.

Note: When stitching delicate and flimsy fabrics, it is recommended to feed a piece of tissue paper underneath the material which will protect the underside of the material, prevent puckering, and can readily be torn off afterwards.

11. Choosing the Proper Needle

Standard round-shank needles with round point and $^5/_{64}$" shank diameter are used with the PFAFF 436. Model A machines for sheer fabrics require short needles, System 133 R, whereas Model B and C machines use needles, System 134 R, which are $^5/_{32}$" longer. The standard shank diameter of $^5/_{64}$" is imprinted on the needle wrapper.

The needle is of eminent importance for obtaining a perfect seam and therefore should be chosen in proper relation to the thread and fabric weights used.

For lightweight fabrics, a thin needle should be used to prevent ugly needle marks in the fabric.

When using a thin needle with a thick thread, the **thread is likely** to break, and, conversely, when using thin thread in a thick needle, **skipping of stitches** may occur as a result.

Select the proper needle from the chart below:

Needle and Thread Chart

Needle Size	Thread Weight		Needle Size	Thread Weight	
70 75	Cotton Silk, short fiber Silk, genuine	100-80 100/3 100/3 (0)	100	Cotton Silk, short fiber Silk, genuine Linen thread	40-30 60/3 60/3 (D) 90-80
80 85	Cotton Silk, short fiber Silk, genuine	80-60 80/3 80/3 (B)	110	Cotton Silk, short fiber Silk, genuine Linen thread	30-24 50/3 50/3 (E) 80-50
90	Cotton Silk, short fiber Silk, genuine	60-40 70/3 70/3 (C)	120	Cotton Silk, short fiber Silk, genuine Linen thread	30-16 40/3 40/3 60-40

Note: We warn you to use needles of unknown origin even if the needle wrapper should bear the inscription "Needles for Pfaff Sewing Machines" plus the needle system.

Never use rusty needles!

Only the exceptional quality of the finish of the needle ensures trouble-free sewing and prevents thread breaking. Due to the high speed of the PFAFF 436, a needle with a rough surface gets hot quickly and thus burns the thread. This is particularly true of Nylon thread which is very sensitive to heat and melts easily.

If the standard needle should get too hot when stitching in dense material or running the machine for a longer time, it is recommended to exchange the ordinary needle for a mirror-finished, chromium-coated high efficiency needle, Systems 133 or 134, which may be procured from us.

12. Changing the Needle

1. Raise the needle bar to its highest position.
2. Loosen the needle set screw **a** (Photo 6) with the small screw driver.
3. Pull out the needle.

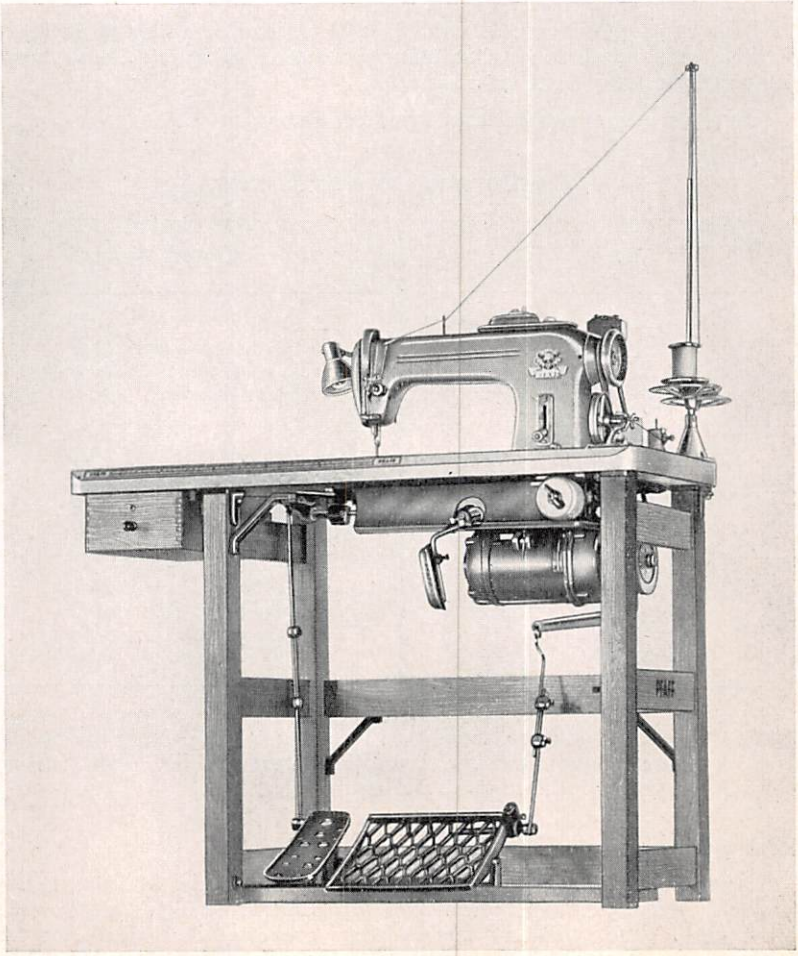

Photo 12

4. Insert new needle, Systems 133 R or 134 R, with the short groove facing right and push it up as far as it will go.

5. Tighten the needle set screw **a** firmly.

13. Regulating the Length of Stitch

The PFAFF 436 is fitted with the proved spring-activated stitch regulator which can be set for the length of stitch desired by turning the thumb nut **A** (Photo 2). A special device locks the length of stitch set so that it cannot be changed inadvertently while sewing. The numbers on the scale indicate the length of stitch in millimeters. Through pushing the stitch regulator lever up as far as it will go, the machine is set for reverse feeding.

Shifting the machine to reverse stitching can either be done by hand or by foot control. After letting go of the stitch regulator lever, it will automatically return to its initial position. The treadle for the stitch reversing device

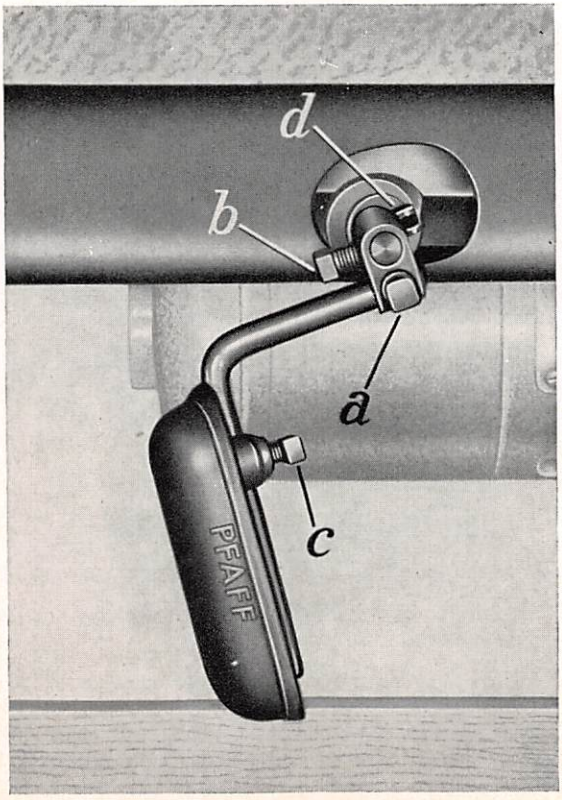

Photo 13

is arranged at the left to relieve the right leg which has to actuate the knee lifter. Through this device both hands are free to manipulate the work (Photo 12).

14. The Knee Lifter

The PFAFF 436 is fitted with a knee lifter device which is harmoniously connected with the head of the machine.

The presser foot is either lifted by raising the presser bar lifter by hand, or by actuating the knee lifter with the right knee. The knee lifter pad can be adjusted horizontally and vertically. For horizontal adjustment, loosen screw **b** and adjust at screw **a**; for vertical adjustment, loosen screw **c** (Photo 13). To permit tilting the head back, the knee lifter shaft with the knee lifter can be pulled off after pulling out piston pin **d** (Photo 18) which can easily be reached through an opening in the dress guard.

15. The Hook

The PFAFF 436 is fitted with the proved hook of Model 134, rotating twice per cycle. The only difference between previous models and this one is that the PFAFF 436 hook is provided with centrifugal lubrication.

The hub of the hook shaft is provided with an oil retainer ring which, being properly balanced, ensures an absolutely vibrationless running of the hook. The oil emerging from a hole in the hook shaft bushing is atomized by centrifugal force and then enters the hook race through a second bore where it effects a dependable and permanent lubrication.

The amount of oil, set for average sewing requirements at the factory, can be regulated after removing the needle plate as instructed in Section 23. This job, however, should only be performed by a mechanic.

16. The Mechanical Opener

All varieties of the PFAFF 436 are fitted with positive mechanical opener.

Since the advantages of this device are not generally known, we should like to add a few explanations here.

With a lockstitch machine the locking of the needle and bobbin threads is done in two different ways, depending on the class of machine. Either, as with oscillating or vibrating shuttle machines, the threads are locked by passing the bobbin thread in a shuttle through the needle thread loop which has been formed while the needle, having passed the lowest point of its downward stroke, is rising, or by passing the needle thread loop around the bobbin case with the latter being in a stationary position.

In machines having oscillating loop takers, such as central bobbin machines, the loop forming part, while moving back and forth, passes the needle thread loop around the bobbin case with the latter being mounted in a central or eccentric position.

With the type of loop taker generally used for high speed sewers, the horizontal hook rotating twice per cycle, which is also used in the PFAFF 436, the needle thread loop is passed around the stationary bobbin case at every other revolution of the hook.

With rotary hook machines, having no mechanical opener, the needle thread, after having been passed around the bobbin case, has to turn the bobbin case slightly making an opening through which it can pass.

With the increasing sewing speed the friction between the hook race and the bobbin case increases accordingly and causes the bobbin case stop to increase its pressure on the bobbin case position finger. As a result, the needle thread has to overcome a stronger resistance when passing between the stops. This intensified strain, in turn, can only be overcome by easing the thread tension to prevent thread breaking.

The drawback of this remedy lies in the fact that in most cases the needle thread tension has to be eased to an extent which makes proper setting of stitches impossible if the machine is operated at reduced speed. To eliminate these disadvantages, PFAFF High Speed Sewers are fitted with a mechanical opener, whereby a small lever mounted on the mechanical opener shaft assumes the function of moving the bobbin case back sligthly at the proper moment and contrary to the rotating direction of the hook. This way the needle thread is permitted to pass freely between the position finger and the bobbin case stop. The advantages of this device for high speed sewers are manifold. First the needle thread tension need not be changed, irregardless of the sewing speed, since the needle thread is not exposed to additional or ever-changing strain. As a result, also for sheer fabrics the thread tensions can be set so as to ensure even setting of the stitches and to prevent puckering of the material at all speeds. Second, threads of a low tensile strength may be used on this machine even for high sewing speeds since the danger of thread breaking has greatly been eliminated. Third, also while the bearing surfaces of the hook have not become completely smooth yet, the machine will sew flimsy fabrics at top speed.

All of the above advantages account for the fact that also the varieties of the PFAFF 436 intended for heavier materials are fitted with the positive mechanical opener.

Timing of the mechanical opener should only be performed by a mechanic as instructed in Section 29.

17. Tilting the Head of the Machine

To facilitate the removal of lint having accumulated between the feed dog and the hook, the machine can be tilted back after taking off the knee lifter.

For this purpose, reach through the hole in the middle of the dress guard under the table and pull back the piston pin **d** (Photo 18). Then the knee lifter with the knee lifter shaft can be pulled out at the front. Having done this, the head can be tilted back and rested on the wooden machine rest or on the sew light bracket after the latter has been swung off.

18. Taking the Hook Apart

Skilled operators who make it a routine to start or finish a seam only with the take-up in its highest position, or to place the threads back under the presser foot when commencing to sew, will hardly ever encounter thread jamming in the hook race.

Should thread jamming occur, however, first try to get a hold of the loose end and to pull it out while jerking the balance wheel back and forth. If this attempt fails, take the hook apart, proceeding as follows:

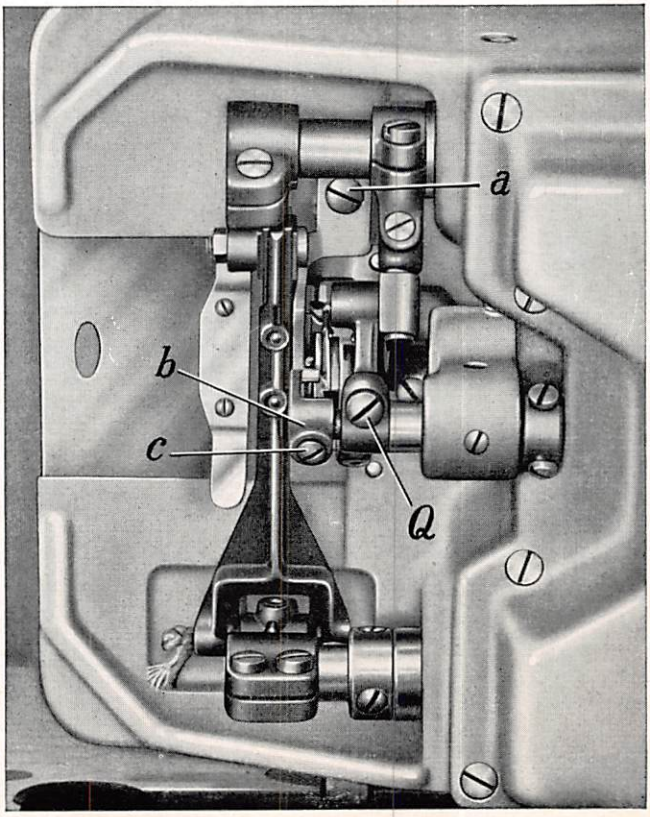

Photo 14

1. Tilt the head back as instructed in Section 17.
2. Raise the needle bar and the take-up, provided the balance wheel can still be turned. If not, remove the bobbin case position finger bracket **a** (Photo 14) first.
3. Loosen set screw **c** and pull off the mechanical opener lever **b.** When reassembling the parts, the proper position of the mechanical opener on the shaft can easily be reestablished since the shaft is marked by a groove.
4. Pull out the bobbin case cover with the bobbin, seizing it by the latch with thumb and forefinger.
5. Raise the head of the machine and remove needle plate and feed dog.
6. Loosen screws, e_1, e_2, and e_3 (Photo 15) and take off the hook gib **d** which, however, should not be confused with the hook body guard **f**.

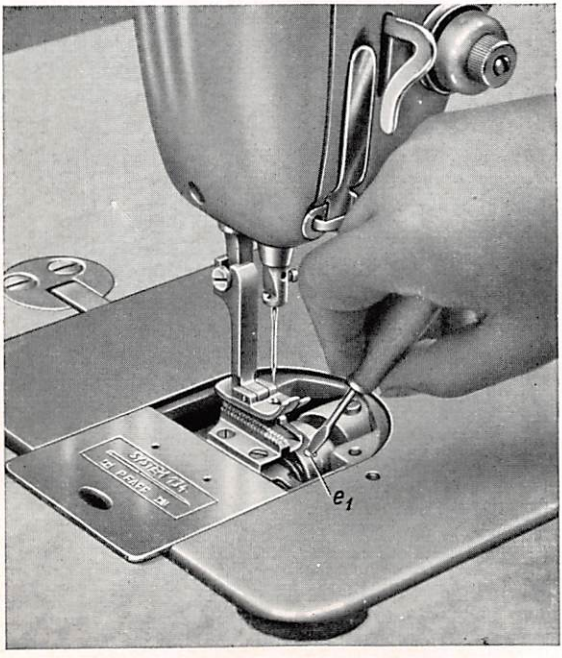

Photo 15

7. Turn the balance wheel until the first screw f_1 in the hook body guard **f** is opposite notch **i** in the bobbin case (Photo 16). When in this position, the bobbin case base can be taken out of the hook. Photo 17 shows the hook components in the same position whereby it should be noted that point **1** of the bobbin case base should be between point **g** of the hook and point **f** of the body guard.

8. Seize the bobbin case base with thumb and forefinger, pull it to the left and down, and take it out.
9. Clean the hook and the bobbin case base thoroughly, and remove fluff with a pointed wooden instrument, never with a screw driver.
10. Before replacing the bobbin case base, it is recommended to screw on the bobbin case position finger bracket **a**. Then insert the bobbin case base but make sure that the finger **h** engages in notch **i** in the bobbin case base and that a clearance about .019" wide is preserved between the tip of the finger **h** and the bottom of the notch **i.**
11. Replace hook gib **d** and tighten screws $\mathbf{e}_1$, $\mathbf{e}_2$, and $\mathbf{e}_3$.
12. Push the mechanical opener lever on its shaft whereby screw **c** should engage in the lengthwise groove in the shaft and the lever should cover about $^1/_3$ of the projection on the rim of the bobbin case base. Then tighten screw **c** securely (Photo 14).

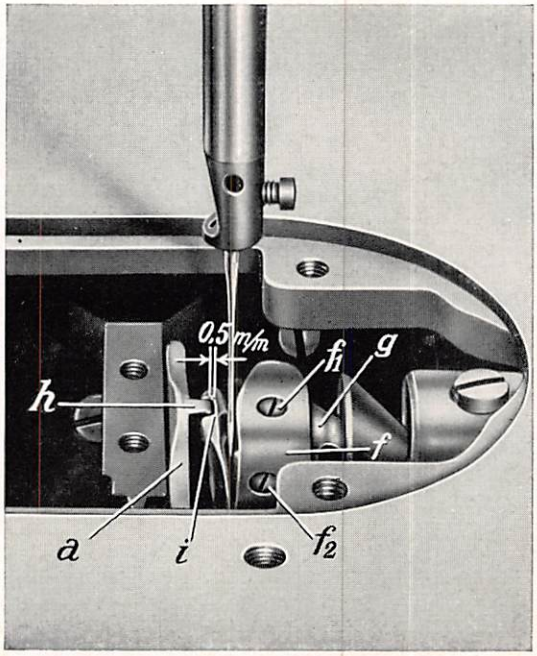

Photo 16

19. Service and Maintenance

Due to the PFAFF 436 being provided with automatic lubrication, there is hardly any maintenance required while the machine is in operation. Merely the automatic lubrication system should be checked, oil filled up, and the machine cleaned regularly.

When the machine is in constant use, it is urgently recommended to make it a daily routine to remove with a brush the lint and fluff that have accu-

mulated between the needle plate and the feed dog and on the hook. Since this fluff contains a high percentage of dressing which has an abrasive effect on the sewing mechanism, the parts would be worn off unduly. The whole machine, including the bottom, should be wiped off with a soft rag regularly.

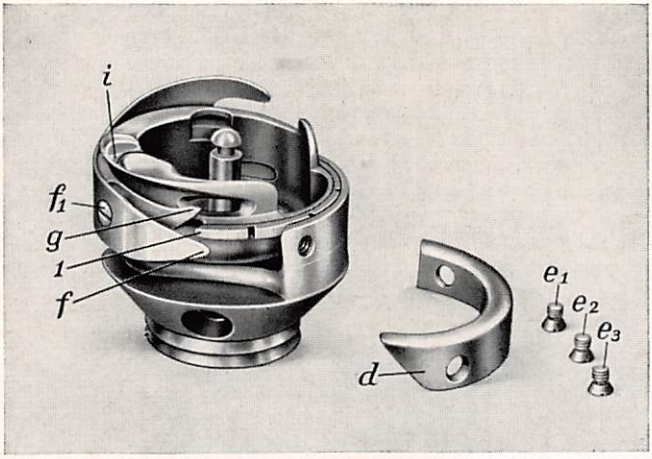

Photo 17

Great emphasis has been placed on making the oil reservoirs in the PFAFF 436 as tight as they possibly can be. But every expert knows that with no machine containing larger quantities of oil—and sewing machines are no exception—can the capillarity of the oil be completely eliminated. Capillarity or capillary attraction designates a property of thin oil to spread in all directions and to leak through even the tightest packings, covering the outer surface with a thin film of oil. Through a functional distribution of vent holes, the occurance of excess pressure causing an expansion of the oil has greatly been eliminated, but even so, for the reasons enumerated above, the possibility exists that a minor leakage occurs after the machine has been idle for several days, or if the temperature rises above normal. In this case, however, we urge you not to choke the oil flow drastically as this might easily result in insufficient lubrication once the temperature has dropped to normal. This temporary nuisance can simply be remedied by wiping this film off the machine with a dry rag, particularly on the needle and presser bars and under the head, and thus to prevent soiling of the work.

In many instances, clear, white oil is preferred for sewing machines to prevent yellowish spots in the work. We should like to point out in this connection that yellowish oil is as pure and free from color particles as any other brand and that the only reason it appears yellow is the effect of optical refraction, similar as with cut edges of glass which appear yellow, green, or blue.

The oil supply for all lubricating points should only be regulated by a mechanic.

Instructions for Mechanics

20. The V-Belt Drive

When mounting the belt for the first time, care should be taken that it is not forced on the motor pulley as a crookedly stretched belt wears out more quickly. Instead, the belt should be placed in the groove of the pulley rim after lifting the motor somewhat. Then the tension of the belt should be regulated very conscientiously. As may be seen from photo 18, the motor is mounted to a hinged bracket and is provided with a simple device permitting adjustment of the belt tension without tools. For this purpose, lift the motor somewhat and loosen wing screw **k.** Now the motor can be moved up or down with stud **m** sliding in bracket **l,** as may be required to give the belt the proper tension. The tension should never be set too tight so that the full weight of the motor presses on the belt as this would cause excessive pressure on the bottom surface of the arm shaft bearings and might easily damage the arm shaft, or result in binding and overheating of the machine.

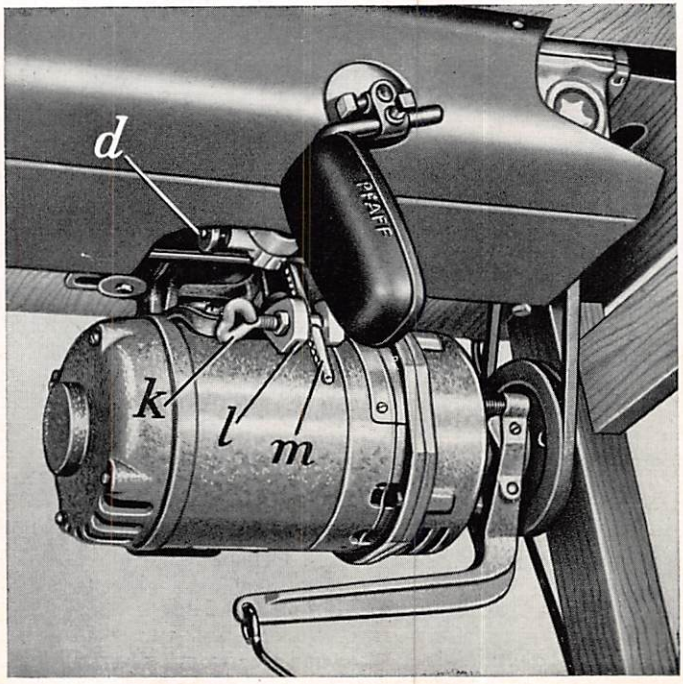

Photo 18

Note: After regulating the proper belt tension, tighten wing screw k securely so that it cannot get loose while sewing.

21. Regulating the Automatic Lubrication System

The oil flow to the hook, the individual arm shaft bearings, and the head parts can be regulated separately and, when leaving the factory, is set for normal requirements. To adapt the oil flow to any specific requirements, readjustment by a mechanic may become necessary. Thus, if the machine is used for permanent heavy duty operations, such as the seaming of whole bales of fabric, a more liberal supply of oil is required than would be necessary if the machine is used for short seaming operations. Sudden changes of temperature, particularly abrupt rises in temperature, may call for a temporary adjustment of the oil supply.

Arm and head parts are supplied with oil by means of oil tube **1** (Photo 19). Through a hole in this tube a jet of oil squirts up, hits the indicator cap in the oil gauge dome and thus indicates that the oil pump is functioning properly. The oil having bounced back from the cap then sprays the bevel gears, pitman rods, and eccentrics so that a constant film of oil is provided between all parts in moving contact. Two valves are provided in the oil tube **1**, one regulating the oil supply for the front and center arm shaft bearings and the head parts, and the second for the rear arm shaft bearing.

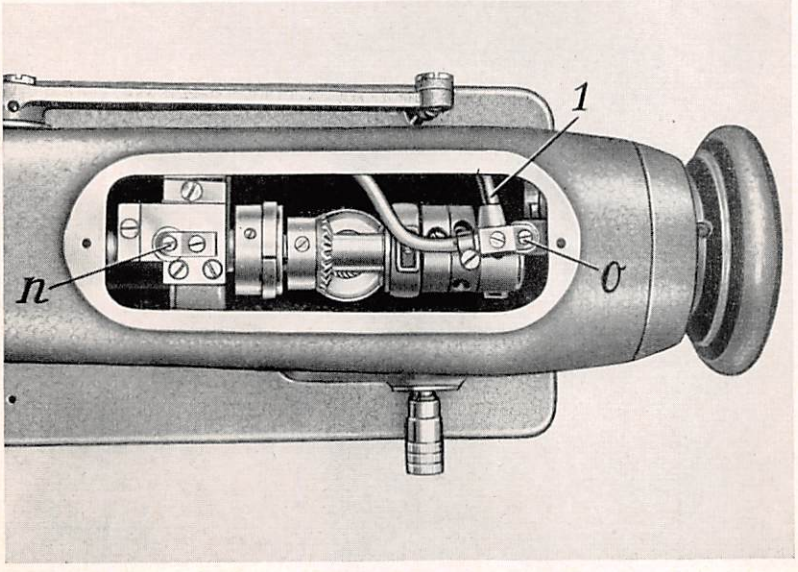

Photo 19

If the valve slots **n** and **o** (Photo 19) point lengthwise, the valves are open. When turning them, the oil supply can be regulated as required or shut off completely. We recommend, however, to leave valve **n** open and thus to ensure proper lubrication of both arm shaft bearings and the head parts.

22. Regulating the Lubrication of the Head Parts

As can be seen from photo 20, the hollow arm shaft is closed at the end with center stud **o** which is secured in its position by screw **p** at the right of the former. This stud serves to regulate the amount of oil being pressed from the hollow arm shaft into the arm shaft crank. For adjustment, loosen screw **p** by turning it **right.** If the red mark on the arm shaft crank is opposite the symbol +, the oil flow to the arm shaft crank is open. When turning the stud right or left so that the red mark is opposite symbol —, the oil flow is diminished accordingly (Fig. 20a).

There is no hard and fast rule for the amount of oil required for sufficient lubrication of the head parts. This, however, can easily be found out by the following test: Hold a piece of cardboard between the presser bar and the rear of the machine head and run the machine at top speed. Now turn the oil regulating stud **o** until two thin stripes of spray oil appear on the cardboard which should be the case after a maximum of 10 seconds.

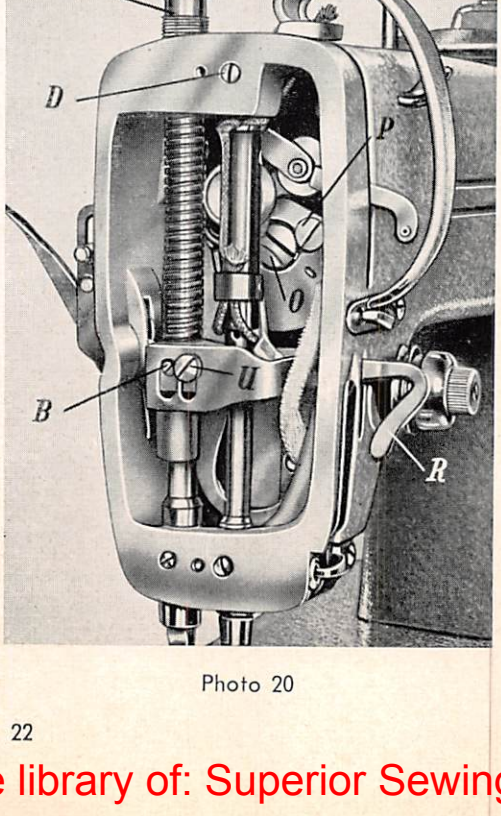

Photo 20

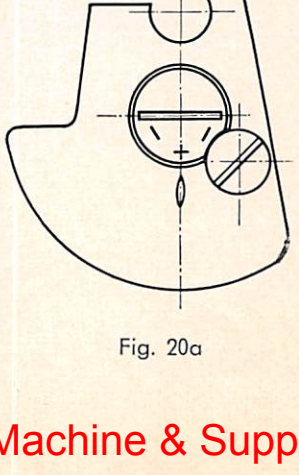

Fig. 20a

To ensure adequate lubrication of the needle bar which is under heavy strain constantly, an oil packing has been passed through the thread take-up link stud, wound around the upper needle bar bushing (Photo 20), passed down to the lower needle bar bushing, wound around the needle bar, and secured by a clip strap.

A second oil wick is passed from the take-up link stud to a small oil pad screwed on in the upper part of the machine head which delivers oil to the take-up link whenever the latter brushes past.

23. Regulating the Lubrication of the Hook

Before the machine is put in use, the proper functioning of the hook lubrication system has to be checked. For this purpose, remove the needle plate to gain access to screw **q** (Photo 21) regulating the oil flow to the hook. This screw is to be turned with a small screw driver as follows:

Turning the screw left —More oil
Turning the screw right—Less oil

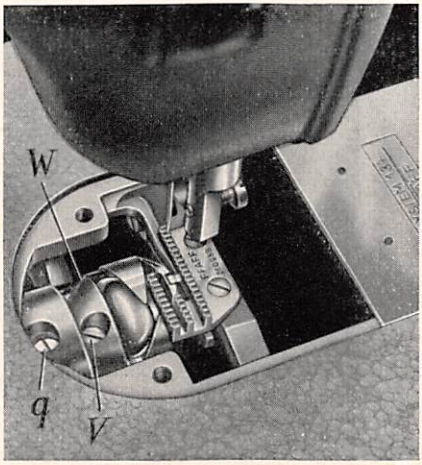

Photo 21

Hook Lubrication Diagram

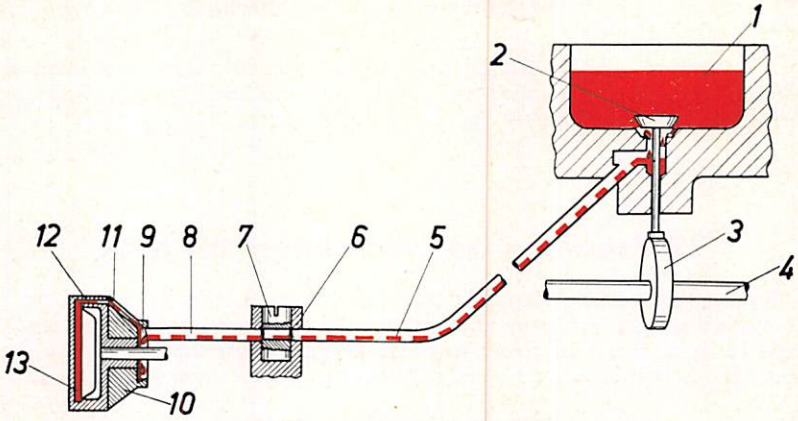

Fig. 22

1. Oil reservoir, upper
2. Valve
3. Four-segment centrifugal governor
4. Arm shaft
5. Oil tube
6. Hook shaft bearing, front
7. Oil regulating screw
8. Hook shaft bearing oil conduit
9. Oil retainer ring groove
10. Oil retainer ring
11. Oil retainer ring bore
12. Hook oil bore
13. Bobbin case base race ring

If the hook should become so hot that you cannot touch it with your hand, or if the thread should be blackened by the hook, these symptoms indicate that the hook is lubricated inadequately. Oil spots on the bobbin case indicate that there is too much oil fed to the hook which is apt to soil the work.

The drip oil lubrication system used for the hook is shown in Figg. 22.

The hook lubrication oil reservoir **1** in the top cover on the machine arm has a valve **2** in its bottom. The oil flow is regulated in proportion to the sewing speed by means of governor **3** on arm shaft **4**. Centrifugal force actuates the four segments of the governor. The faster the machine runs, the more pressure is exerted by these segments on the lower end of a plastic connecting lever which, in turn, transmits the pressure to the valve plunger. This plunger effects the opening of the valve to a higher or lesser

degree, depending on the amount of pressure exerted by the governor segments. Via oil tube **5** the oil travels then to the front hook shaft bearing **6.** Prior to passing the oil conduit **8,** it passes the oil regulating screw **7** which is enclosed in the hook shaft bearing in an oblique position and serves for fine adjustment of the oil flow. The oil dripping into groove **9** of oil retainer ring **10** is flung out by centrifugal force and thus enters bore **11** and, finally, bore 12 in the hook which lubricates the bobbin case base race ring in the hook.

After the oil flow to the head parts and the hook has been checked, it can easily be adapted to specific requirements.

24. Changing the Oil

As with any high speed sewing machine, changing the oil is of utmost importance also for the PFAFF 436. Although the lubricating properties of the oil are not lessened as a result of overheating the oil in the machine, it is nevertheless very important and will serve to increase the service life of your machine considerably, if, particularly in the beginning, the oil is changed frequently and the abrasive effect of metal grit—inevitable with every new machine—is thereby diminished.

Therefore, we recommend to change the oil as follows:

First change	after 1 week's operation
Second change	after 4 weeks' operation
Third change	after 3 months' operation
and thereafter	every 6 months

This schedule, of course, only applies to the automatic lubrication system, whereas the oil required for the hook lubrication has to be replenished currently.

To drain the oil, remove the large oil drain screw on the bottom of the bed oil reservoir while the machine is idle. Care should be taken that no used oil, mud, or grit remains in the reservoir.

The used oil is not useless but can be filtered mechanically (through several plies of linen) and reused for other lubrication purposes.

Fresh oil is filled in as instructed in Section 2.

25. Regulating the Throw of the Thread Check Spring

The thread check spring assists the thread take-up in taking up the slack of the needle thread after the loop has passed around the bobbin, in setting the stitch to the desired tightness, and in checking the slack of the needle thread after thread has been drawn from the spool by the descending take-up until the needle has penetrated the material.

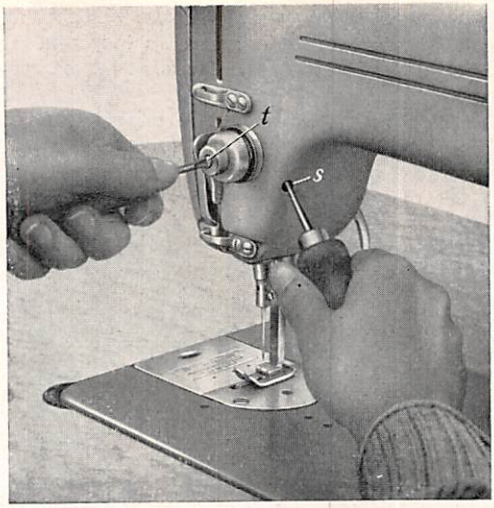

Photo 23

The trip made by the thread check spring during this operation is limited by a stop on its bushing, and can be adjusted as required by turning this bushing. For this purpose, loosen set screw **s** (Photo 23), and turn tension pin **t** with a screw driver.

The thread regulator **R** (Photo 20) is mounted to the presser bar guide collar which causes it to follow the motion of the presser bar when passing over irregularities in thickness of the material and to compensate for the higher amount of thread required for thicker spots in the material so that the thread check spring need not take up so much slack of the thread.

The thread regulator can be adjusted vertically after loosening screw **u** (Photo 20). This adjustment serves the same purpose as that effected by turning the check spring bushing. We recommend to coordinate both adjustments so that, in addition to a proper control of the amount of thread, the check spring takes up the thread slack by drawing in a vertical plane.

Note: Once you know the functions performed by the thread check spring and the thread take-up, you will be in a position to perform proper adjustment without trying out different settings first.

The thread check spring is correctly adjusted if it has completed taking up the slack of the thread when the needle stitches into the material. Since with the PFAFF 436 the trip of the take-up is somewhat longer than normal, it may be necessary to allow the thread check spring somewhat more play than usual so that it is still slightly tense at the time the needle stitches into the material.

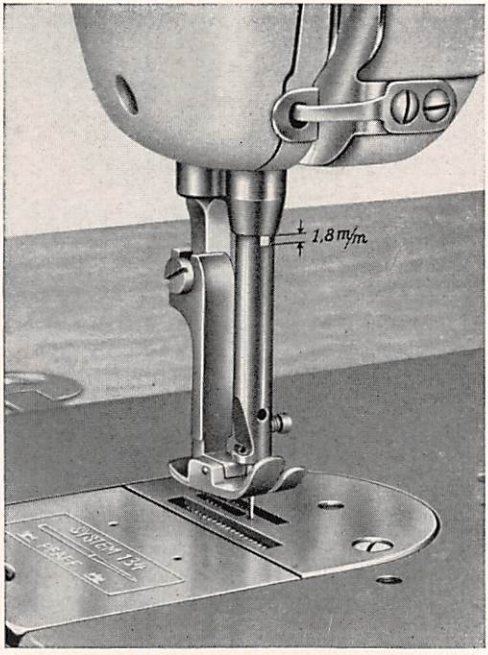

Photo 24

26. Setting the Needle Bar at Correct Height

To facilitate setting the needle bar at the correct height, a small depression has been milled in it (Photo 24). When the needle bar has reached the lowest point of its downward stroke, the upper edge of this mark should be in line with the lower edge of the lower needle bar bushing. This mark is .070" (1.8 mm) wide which distance corresponds to the needle bar rise (to form the loop). With the PFAFF 436, the point of the hook should be just opposite the center line of the needle and .039" (1 mm) above the top of the needle eye when the needle on its upward stroke has risen .070" from the lowest point of the stroke, which is the position in which the point of the hook is about to enter the loop after the latter has been enlarged sufficiently.

Timing the needle bar rise and the hook motion is generally referred to as adjusting the needle bar rise.

For adjusting the needle bar rise, we recommend to use the gauge which will be supplied by us upon request.

Photo 25

Begin by lowering the needle bar to the lowest point of its stroke, place the gauge (.070" thick) on the needle bar immediately under the lower needle bar bushing. Position the clamp beneath it and screw it on (Photo 25). Now remove the gauge, and turn the balance wheel slowly until the clamp strikes the needle bar bushing. When in this position, the hook should be adjusted to meet the above requirements.

27. Timing the Hook

To turn the hook on the hook shaft until it is in the position described in the preceding section (point of hook .039" above top of needle eye), first remove the needle plate, and then loosen the hook set screws **v** and **w** (Photo 21).

The sideways adjustment should be made with particular care so as to ensure that there is a clearance of .004" (0.1 mm) between the point of the hook and the needle.

Note: When making the above adjustment or inserting a new hook make sure that a maximum play of .012"—.016" (0.3—0.4 mm) exists between the hook and the hook shaft bushing. This distance can easily be measured between the point of the hook and the needle.

After having made the sideways adjustment of the hook (point of hook .004" apart from needle), a minimum play of .008"—.012" (0.2—0.3 mm) between the hub of the hook and the hook shaft bushing must be preserved to ensure proper lubrication of the hook.

28. Changing the Hook

1. Remove the needle, the needle plate, and the bobbin case position finger bracket.
2. Loosen set screw **c** and pull off the mechanical opener **b.**
3. Loosen the hook set screws **v** and **w** (Photo 21).
4. Turn the balance wheel until the feed dog has risen to its highest position.
5. Pull off the hook from the hook shaft.
6. With the feed dog in its highest position, push the new hook on the hook shaft, and replace the bobbin case position finger bracket.
7. Time the hook as instructed in Section 27 and tighten the set screws **v** and **w** securely.
8. Replace and screw on the mechanical opener as instructed in paragraph 12, Section 18,
9. Screw on the feed dog and the needle plate.

29. Timing the Mechanical Opener

Many mechanics find it rather difficult to properly time the mechanical opener. This very adjustment, however, should be made very meticulously in order to preserve the advantages of this device outlined in Section 16. There are two steps to be observed:

1. Adjustment of the mechanical opener drive, and
2. the timing of the mechanical opener motion.

The oscillating motion of the feed lifting shaft is transmitted via a sleeve joint to the mechanical opener shaft which, in turn, causes the mechanical opener lever to make an oscillating motion.

After loosening the binding screw, the binding collar on the feed lifting shaft should be turned so as to ensure an equidistant throw of the sleeve joint on both sides of the center line (indicated by dotted lines in Photo 26).

The point of the mechanical opener set screw should engage in the lengthwise groove in the mechanical opener shaft which eliminates the necessity of adjusting the mechanical opener laterally whenever it has been removed for taking apart the hook.

In case sideways adjustment should become necessary, this is done by turning the mechanical opener shaft after loosening the binding screw **Q** at the lower jaw of the sleeve joint (Photo 14).

To properly time the mechanical opener the mechanical opener shaft should be turned so that the mechanical opener lever strikes the projection on the bobbin case and just starts opening the bobbin case at the time the point of the hook is about one-eighth of a revolution short of its top position, i.e. at north-east, after the loop has passed around the bobbin case.

Since the motion of the mechanical opener lever is very slow and hardly perceptible, we recommend to push the bobbin case over to the right at the bottom and to place a thin piece of paper between the mechanical opener lever and the projection of the bobbin case. Thus the position can easily be established in which the lever begins to hold the paper in position, i.e. in which it starts opening the bobbin case.

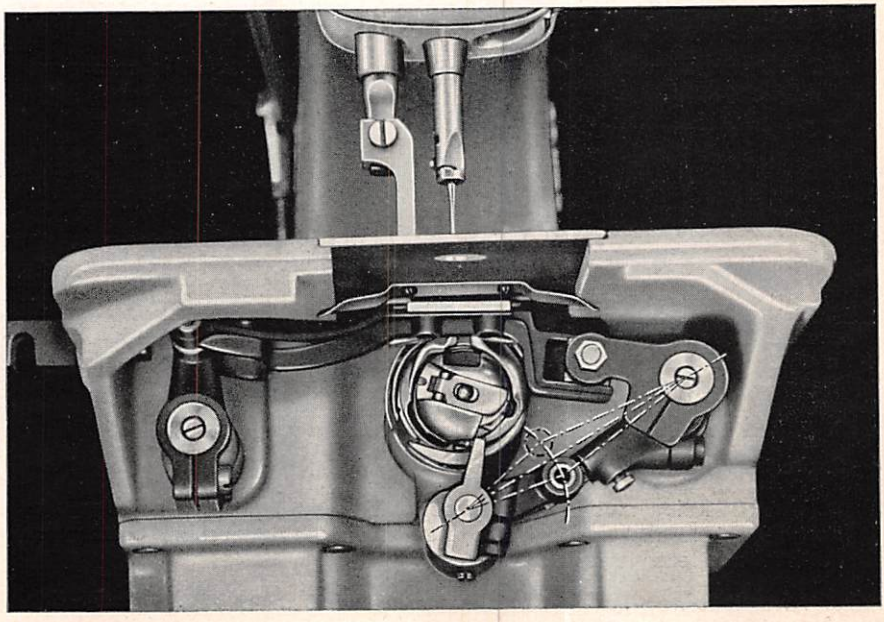

Photo 26

Note: When timing the mechanical opener, care should be taken that the upper and lower jaws of the sleeve joint are not moved sideways on the shaft. Under no circumstances must the mechanical opener shaft be allowed any end play. If existent, it should be corrected by adjusting the jaw or the set collar **s** (Photo 27).

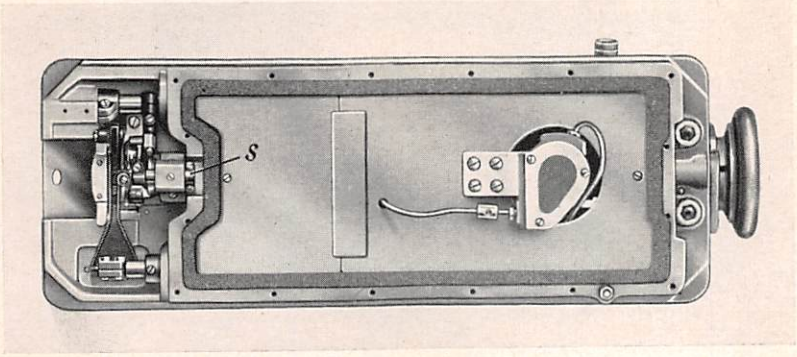

Photo 27

30. Disassembling the Link Take-up

1. Remove face plate, presser foot, and needle.
2. Loosen the presser bar adjusting cap screw, pull out the presser bar spring, loosen the presser bar guide collar set screw **B** (Photo 30), and pull out the presser bar at the top.
3. Loosen needle bar binding screw **C** and set screw **D** (Photo 20) in the upper needle bar bushing, remove the oil wick clip and the oil wick, and pull out the needle bar at the top.
4. Loosen locking screw **E** at the back of the machine (Photo 28).
5. Turn the balance wheel until the needle bar link crank screw in the arm shaft crank can be reached through hole **G.**
6. Loosen the needle bar link crank screw.
7. Loosen the take-up link stud set screw.
8. Unscrew the top cover and pull out the packing in the hollow hinge stud of the take-up link.
9. Place bar **K** across the head of the machine as shown in photo 29, insert screw $^{3}/_{16}$"×28 in its hole, and screw it into the hollow, threaded hinge stud, turning it toward the take-up link, and thus pull out the hinge stud. (In lieu of bar **K** any iron bar about 4" long with a $^{13}/_{64}$" (5 mm) hole may be used).
10. Carefully pull out the link take-up with its link, the needle bar link crank, and the needle bar link, all in one.

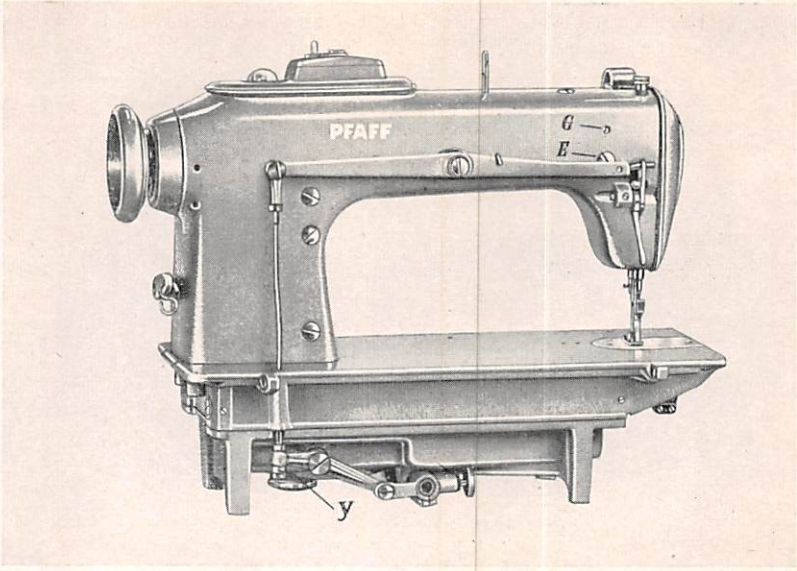

Photo 28

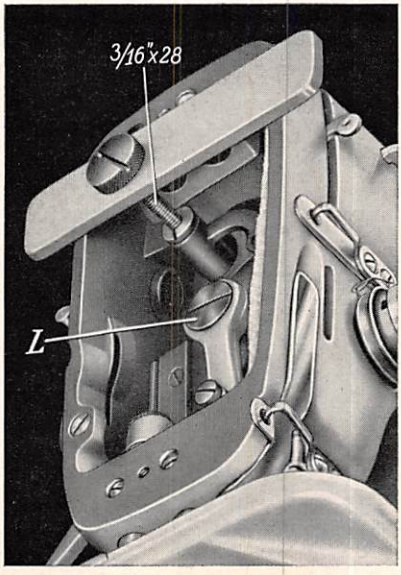

Photo 29

Note: Don't use force when removing the take-up components since all parts are precision-made and meticulously fitted. Also avoid any blows so as not to dislocate the pressed-in bearing rings.

The upper bearing of the take-up and the lower bearing of the needle bar link are honed needle bearings. To loosen end screw **L,** turn it **right** (Photo 29).

When taking the assembly apart, take care that none of the tiny bearing needles gets lost. Each bearing contains 18 bearing needles. To facilitate inserting the needles, the bearings are provided with some clean grease making the needles stick. Use a pair of pincers for inserting the bearing needles.

Reassembling the take-up and head components should be done in reverse sequence, using utmost care.

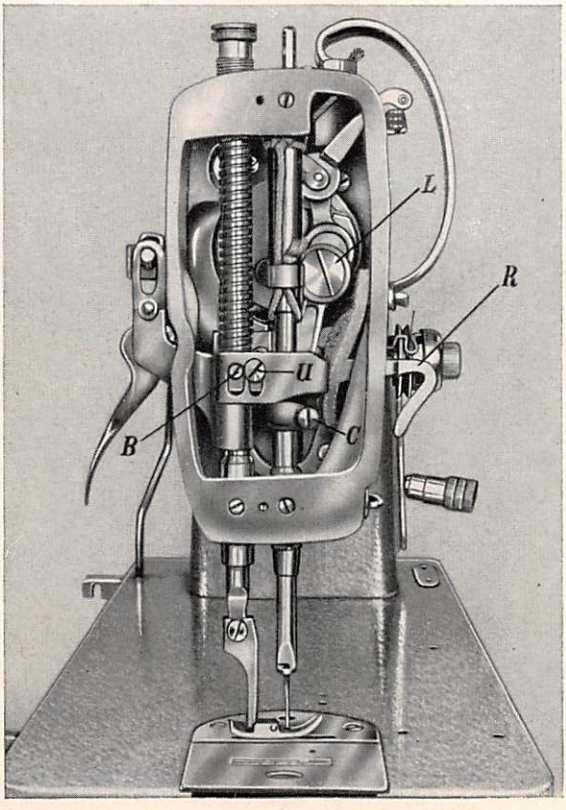

Photo 30

To pull the oil packing through the take-up link stud, it is advisable to use a thin wire with its one end bent. The oil wick leading from the take-up link stud to the upper needle bar bushing should be fastened to the latter (Photos 29 and 30) so that the wick does not contact the presser bar spring as the excessive oil supplied by the wick might leak through the presser bar bearing and soil the work.

31. Adjusting the Length of Stitch for Forward and Reverse Feeding

Model A and B machines of the PFAFF 436 can be set so as to produce stitches of equal length when sewing forward or reverse. This means that the needle, when stitching reverse, will penetrate the fabric in exactly the same hole that it has made while sewing forward. This feature is much desired for tying off seams.

With Model C machines, the reverse stitch grows proportionally shorter, the longer the length of stitch is set for forward feeding so that with a maximum forward stitch length of $^{13}/_{64}$", the corresponding length of stitch for reverse feeding is about $^{9}/_{64}$".

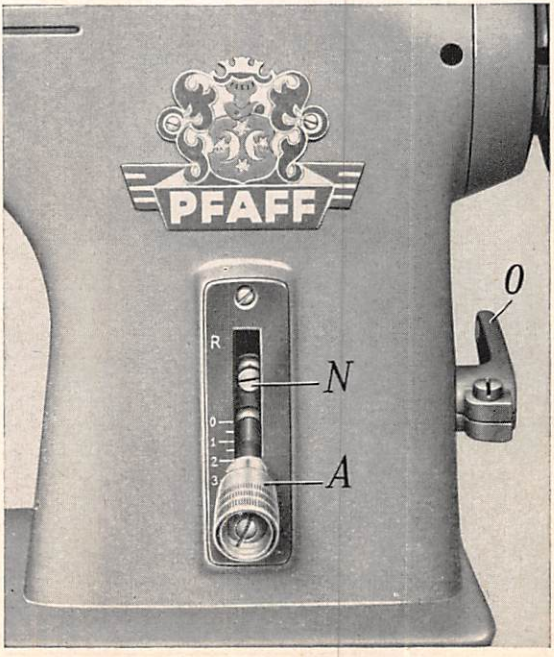

Photo 31

To regulate the length of stitch for forward and backward feeding, loosen the binding screw **N**, visible in the slot above the stitch regulator lever (Photo 31), and turn the stitch regulator lever joint on the stitch regulator axis.

Now hold the stitch regulator lever **A** and adjust by turning lever **O** on the stitch regulator axis. When turning the lever **O** downward, the length of stitch for forward sewing will grow shorter, and conversely, when turning it up, will grow longer.

Thus the relation between the stitch lengths for forward and reverse feeding can be set very exactly after which adjustment binding screw **N** should be tightened firmly.

Note: The larger the maximum length of stitch for forward sewing; the smaller will be the corresponding stitch length for reverse sewing.

32. Removing the Oil Reservoir and Taking the Oil Pump Apart

Due to the fact that all settings for the feed motion, the mechanical opener, and the timing of the hook can be done outside of the oil reservoir, it hardly ever becomes necessary to remove the latter. If, however, in case of trouble with the oil pump, it has to be taken off, proceed as follows:

1. Drain the oil thoroughly.
2. Loosen the pinch nuts **y** (Photo 28), and take off the knee lifter pitman rod components which are mounted on the bottom of the oil reservoir.
3. Tilt the machine over and unscrew all position screws all the way around the oil reservoir.
4. Remove the oil reservoir and rinse it out with kerosene so that all grit is removed.
5. Disconnect all oil tubes from the oil pump.
6. Loosen both screws and remove the two oil reservoir top cover plates (Photo 27).
7. Loosen the four screws and remove the oil pump.
8. Rinse the pump with gasoline and replace it.
9. Clean the gasket rim of the oil reservoir and replace the reservoir. Make sure that the oil wicks are in proper position.
10. Insert all position screws and tighten them crosswise.

Note: As the machine is provided with a special type gasket positioned between the bed plate and the oil reservoir, meticulous care should be taken that it is not injured when removing or replacing the oil reservoir. An injured gasket is completely useless.

33. Probable Causes of Sewing Troubles

Skipping of Stitches

1. Incorrect threading
2. Wrong needle used
3. Needle inserted incorrectly
4. Needle too thin for thread used
5. Needle too thick for thread used
6. Needle bent
7. Needle at incorrect height
8. Too wide a clearance between needle and point of hook (.004").
9. Needle bar rise insufficient
10. Processing adhesive or heavily dressed materials
11. Thread twisted too much

Thread Breaking

1. For any of the reasons above
2. Thread tensions too tight
3. Knotty thread
4. Thread having turned resistant due to extensive and dry storage
5. Inferior quality thread
6. Thread jamming in the hook race
7. Rough edges of needle hole
8. Thread having slipped from the spool and snarled up around the spool pin
9. Incorrect setting of thread check spring
10. Point of needle blunt due to bumping

Needle Breakage

1. Needle bent and struck by point of hook
2. Thread too thick for needle used
3. Timing of hook upset after thread jamming
4. Needle thread tension too tight
5. Needle deflected by hard spots in material
6. Needle bent due to pushing or drawing the material
7. Feed motion in progress while needle stitches into material
8. Hook set too close to needle
9. Needle too thin for material processed
10. Thread snarled up on spool pin

Improper Feeding

1. Feed dog positioned too low
2. Feed dog tooth pattern too fine for material processed
3. Type of feed dog unfit for material processed
4. Insufficient amount of pressure exerted by presser foot
5. Lint accumulated between teeth of feed dog
6. Points of teeth blunt

Overheating

1. Oil hole in hook choked up causing overheating of hook
2. Oil regulating screw **q** (Photo 21) too tight
3. Oil flow for head parts (stud **o** in Photo 20) insufficient
4. Excessive pressure on arm shaft bearings due to V-belt being too tense
5. Full weight of motor presses on V-belt due to motor position device having become loose
6. Improper oil used. (Viscous oil cannot penetrate the narrow conduits if the machine is cold)

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G. M. PFAFF AG, KAISERSLAUTERN

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