ELNA

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MAINTENANCE

TAVARO S.A.

GENEVA

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ELNA

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GENERAL DIRECTIONS FOR MECHANICS

TAVARO S.A.

GENEVA

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GENERAL DIRECTIONS FOR MECHANICS

This manual has been compiled for the use of the technical personnel that takes care of the after-sales and repair service for our ELNA sewing machines. It is mainly intended to be of

practical and useful help

to the ELNA mechanic in his daily work.

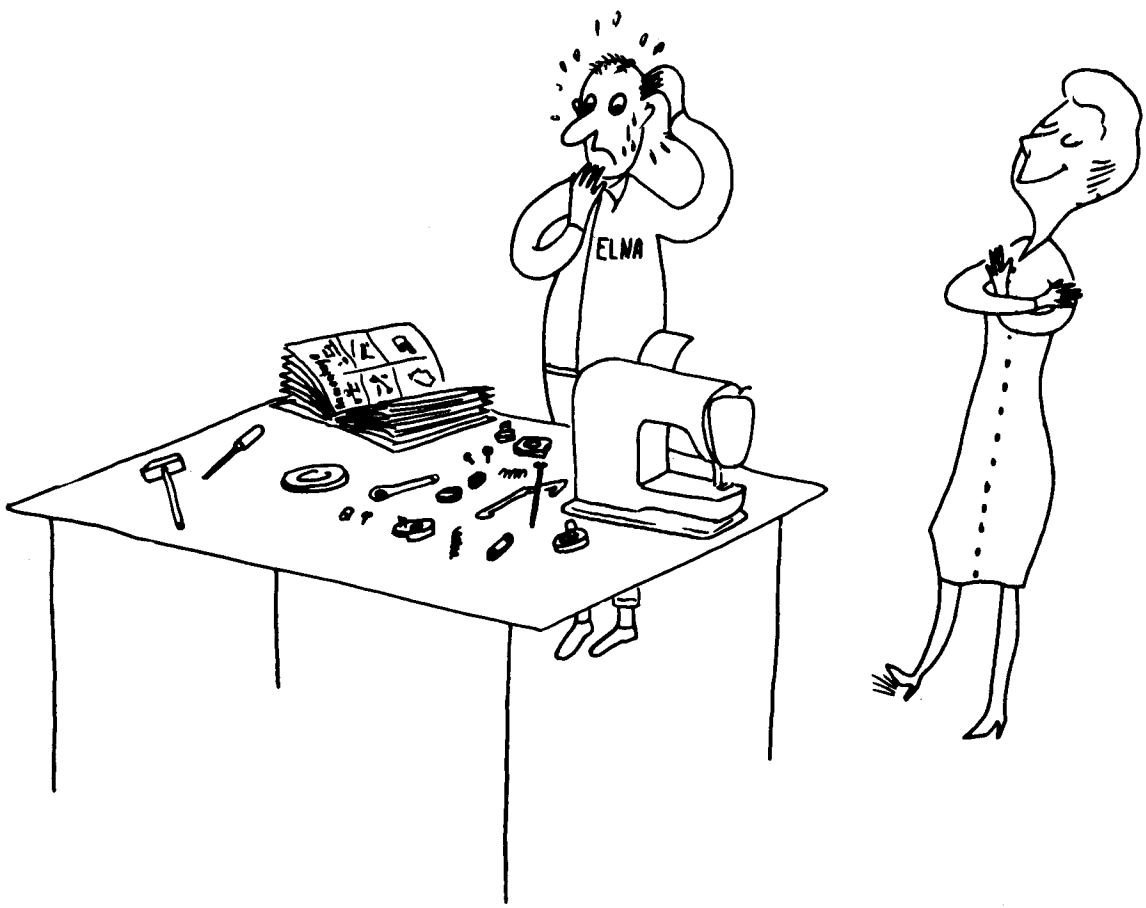
The perfect maintenance of our ELNA sewing machines requires a general basic training as a mechanic. We are today represented in more than 100 countries, where well-trained chief mechanics and mechanics are available, who can be considered experts in repairing our machines. A basic training of new mechanics can thus be given under very favourable conditions.

We have therefore refrained from publishing complete instructions for assembling our different models, but have preferred only to work out

Instructions for Maintenance.

They contain all essential details, however, concerning assembling and regulating our various types of machines, but do not eliminate the need for a general basic knowledge and an introductory training by a chief mechanic. The ELNA tool kit and the spare parts catalogue are the mechanics' most important equipment. All the spare parts are faithfully reproduced in the catalogue, in their exact position and with their design numbers.

We have taken care to illustrate the instructions for maintenance as completely as possible. All the parts are shown as they have to be built into the machine. The text is as short as possible. We have confined ourselves to mentioning in a logical sequence how the spare parts for ELNA sewing machines are to be assembled and more detailed information is only given for details that do not strike the eye. To dismantle the machines, simply proceed in the opposite sense. Certain repairs, on which the perfect functioning of the machine particularly depends, are dealt with separately at the end of the instructions for each model.



We recommend that you follow the prescribed sequence when assembling the machine. This makes it possible for you to assemble or dismantle all the parts in the easiest way and in a minimum of time. This is particularly important

<u>when removing only a limited number of parts</u>

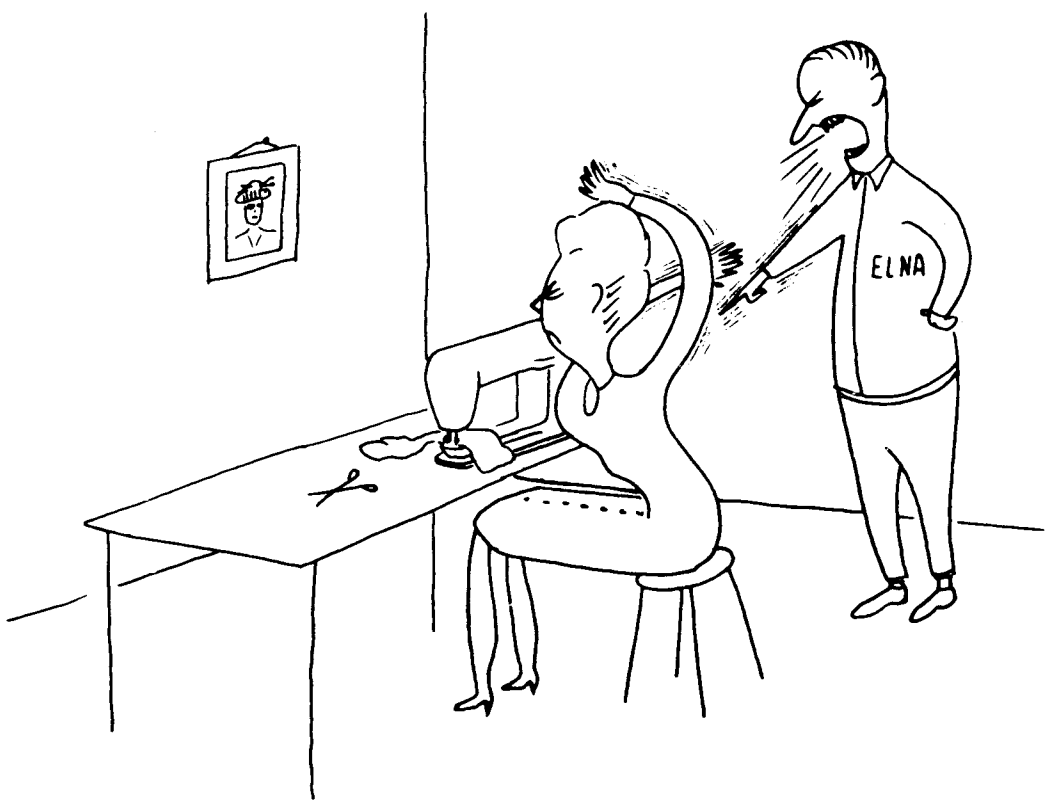
for repair purposes. The different parts are logically grouped, according to their purpose and aim. If not more parts than absolutely necessary are removed, time is saved and repair costs lowered.

When assembling and regulating the ELNA sewing machines, it is indispensable for you to be in possession of the appropriate tools and necessary gauges.

Special Hints

Every mechanic must be in a position, after a quick examination of the machine, to say with certainty, whether the machine is working properly or, if necessary, what repair is needed. The way how to proceed is explained in detail in our manual "Introduction to Minor Repairs".

Often a mechanic is asked to call on customers and finds that the ELNA is working perfectly and that the complaint is only due to non-observation of a certain passage of the instruction booklet. Therefore, if the defect is not obvious, the customer should be asked to operate the machine and then watch, to see



- whether a correct needle (system and size) is used and whether it is properly inserted,
- whether the upper and lower threads are correctly chosen and threaded,
- whether the different adjustments have been made properly,
- whether the thread tensions are set at the correct values.

By proceeding in this manner, it is in most cases possible to find out whether the customer's complaint was justified or not. Every mechanic must know that it is often of serious consequence, if a customer has to send her machine in for repair. If this should happen repeatedly, the ELNA's reputation will surely suffer. Difficulties that are due to a customer's insufficient knowledge should therefore serve to instruct her further and better. In cases of genuine complaints, it goes without saying that they have to be remedied

with the greatest possible care and reliability.

Before taking any work in hand, make sure that the work bench is absolutely clean so that no dust or filings get into the machine and provoke disorders in the course of assembly.

The parts of the machine, especially those which are painted, chromium-plated or nickel-plated, must under all circumstances be handled very carefully.

The parts have to be assembled in such a manner, that the entire mechanism turns as freely as its function requires. Therefore, after fitting every moving part, check to see whether it turns freely. If hard spots are noticed, you must find out what they are due to, without exception. They are then to be remedied.

Greasing the Machine

For lubricating the machine Multifak No. 2 grease (Caltex Oil Co.) is used. If Multifak No. 2 is not available, "BRB" 1 grease (Vacuum Oil Company) will also be suitable.

Oiling the Machine

To oil the machine, "Arctic Oil Light", supplied by the Vacuum Oil Co., should be used. If it is not available, the following other brands can be used:

1. S/V White Oil 309; suppliers: Vacuum Oil Co.
2. Caltex Home Lubricant; suppliers: Caltex Oil Co.
3. Capella Oil AA; suppliers: Caltex Oil Co.
4. Sphinxoline; suppliers: M.L. Paris

Self-lubricating bearings must not come into contact with kerosene or any other detergents but only with oil. Be particularly careful when cleaning with kerosene. Before assembling the machine, the bearings should be soaked in oil again. (Exception: the bobbin winder - it must never be oiled).

With the exception of the thumb screw No. 711'137 (for the fixation of the foot) of the cloth presser bar and the threaded holes on the cover of the free arm and the base plate of the flat bed models (for the fixation of special accessories) which have English threads, the metric system is used for all the screws and threaded holes.

Sewing Samples after a Repair Job

Before giving the machine back to a customer, every mechanic should make sure that the machine is in perfect running order. Only after a sample has been sewn to your full satisfaction with the repaired machine, is it to be considered as properly repaired. The following samples should be sewn:

a. On all Models:

1. Thread the machine with darning thread and darn a hole on ordinary material.
2. Sew a few straight seams forwards and backwards with ordinary sewing thread.
3. Try the particular job the customer complained about.
4. Check the bobbin winder.

b. On Zig Zag Machines:

5. Sew a satin stitch at widths "2" and "4".
6. Make a buttonhole.

c. On Supermatic Machines:

7. Turkish Hemstitch with Elna-disc 101 at widths "2" and "4" on single and double material.
8. Sew pattern No. 107.
9. Make a buttonhole with the buttonhole disc, provided the machine is equipped with it, otherwise with Elna-disc 03.

d. On Automatic Machines:

10. Sew a scallop stitch (Elna-disc 05) at widths "2" and "4".

11. Make a buttonhole with Elna-disc 03.

Important !

Due to the fact that we are continuously improving our ELNA sewing machines, certain alterations are bound to occur from time to time. They are brought to our sales organizations' attention in our "Technical Information Bulletins", which are published periodically. Please always make a note of these alterations.

Every mechanic is to a great extent and decisively responsible for a good customer service. Let us not forget that the ELNA's good name depends first and foremost on a

Perfect Customer Service.

We must therefore endeavour to execute the jobs we are entrusted with very exactly and conscienciously. A job that is well done also gives us greater satisfaction. The instructions that follow are intended to help you to reach this objective.

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KNOWLEDGE OF ELECTRICITY FOR MECHANICS

TAVARO S.A.

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GENERAL EXPLANATIONS

Below you will find a few indications that deal with the maintenance of, the repairs to and changing the voltage of the various motors :

1. TAVARO motors nos 500'890 and 500'958 with adjustable rheostat: These were used, starting with machine number 183'640, for our first ELNA and are divided into groups that have been given Roman numerals I to VII.

   Since the motors no. 500'890 are equipped with ball bearings, their armature cannot be replaced. The armatures for the motors no. 500'958, however, have self-lubricating bearings and are interchangeable.

2. TAVARO motors no. 500'970 with adjustable rheostat : These motors were used on our first ELNA, beginning with machine number 338'000, and are divided into groups A to E. The armatures for these motors are easily interchangeable, as they also have self-lubricating bearings.

3. TAVARO motors for our 1952, 1958 and 1959 models, with free arm or flat bed, namely :

   a. Transforma (Plana) - Zig Zag (Plana Zig Zag) - Supermatic (Plana Supermatic) (1952 models)

   b. ELNA - ELNA Zig Zag - ELNA Automatic (1958 and 1959 models)

   For the standard voltages from 110 to 250 volts, these motors can be used both with alternating as well as direct current. They are divided into five groups A to E. For the Group C motors, however, the upper voltage limit of 160 volts is only valid for alternating current, 42 cycles.

   The electrical part of the motors for our 1952 models and for our 1958 and 1959 models is identical. These motors merely differ in respect of the motor support and the position of the condenser.

   The motors for our flat bed models have no resistance and no contactor, since these parts are located in the foot control.

   For our free arm models with knee control, we moreover supply special motors for the voltages 32, 24 and 20 volts, which are designated by the groups F, G and H, respectively.

   In order to be able to distinguish the motors, the insulation for the short lead to the inductor coils has been given different colours (see tables below). The respective armatures can easily be replaced.

MAINTENANCE

When cleaning or otherwise attending to a machine, the motor should also be checked as follows :

A. Brushes

Check the wear of the carbon brushes and, if necessary, replace them. Make sure that the brush springs are not out of shape. On the first ELNA, excessive lubrication may cause the oil to run along the light wire into the motor. In such cases it is recommended to hold the carbon brushes over a flame, in order to burn the oil.

B. Commutator

In order to avoid excessive wear of the brushes, the surface of the commutator must be very smooth. If the commutator should be a bit worn, it must be polished with a special "Arkansas" stone. Never use emery-cloth for this.

For cleaning the commutators, "Servisol" must be used. Simply dampen the felt at the end of the cleaning stick with it and then press the felt slightly against the commutator with the motor running. With the piece of leather fastened to the other end of the cleaning stick the "Servisol-film" is then dried and the commutator polished.

It may sometimes occur, in a few rare instances, that the commutator of a motor 500'890 or 500'958 is grey (not merely dirty). It is then not enough to clean it with "Servisol". In such cases only, the glass fibre brush may be used for cleaning the commutator, followed by the above "Servisol" cleaning.

C. Self-Lubricating Bearings

The bearing felts of the self-lubricating bearings are to be moistened with a few drops of oil.

REPAIRS

Motor defects are most frequently to be attributed to damage to the armature or inductor coils. These consist of a prescribed number of loops of a very fine wire, insulated with a thin layer of enamel. If, for any reason whatsoever, an overload of electric

current passes through the coils, the wire becomes overheated and the enamel layer cracks. The wire loops then come into contact with each other, thus producing short-circuits, which may considerably modify the resistance of the coils. This may even result in the wire melting, whereby the current is interrupted. A short-circuit can also be caused by defective insulating material.

A. Checking the Motor in the Machine

If the machine no longer attains the prescribed number of r.p.m., it is often possible to determine a defective motor by holding the flywheel back by hand. If you feel that the motor is dead at certain positions, when one or two positions of the contactor are in play, the defect is generally to be attributed to a short-circuited or interrupted armature, provided, of course, that no fault has been found in the mechanical part of the machine beforehand.

B. Checking the Motor with the Test Lamp

The test lamp described in the TIB no. 11 will enable you to determine interruptions in the coils of the motor or any short-circuits with the mass of the motor. This test is to be carried out as follows :

1. With Motor Fitted

Check between points A and K of the motor (see drawing page 865), but in doing so, make sure that all the blades of the contactor are connected with the knee lever. If the bulb of the test lamp does not light up, the electric circuit of the motor has been interrupted at a certain point that still has to be determined. For this purpose the motor casing of the first ELNA or the motors of our 1952, 1958 and 1959 models must be removed from the machine.

2. With Motor Removed

a. Place one contact pin at point A and touch the points B, C, D etc., in turn, with the other contact pin, until the bulb no longer lights up. The interruption will be found between the last point where the bulb lights up and the first point where it remains out.

b. Check for a possible short-circuit with the mass. For this purpose one contact pin is to be placed on the iron part of the armature (M) and the other contact pin at points A, B, C etc. During this test the bulb

should not light up. If it does, the motor is short-circuited with the mass, i.e. a wire with defective insulation has come in contact with the metal part of the motor. By removing the carbon brushes, it is then possible, using the test lamp, to find out whether the short-circuit is in the armature or the inductor.

C. Control of the Inductor Coils by Means of the Ohmmeter

If it should not have been possible to determine an interruption or short-circuit with the mass on a defective motor by using the test lamp, the armature and the inductor coils are to be checked by means of the Ohmmeter.

1. Armature

a. Mark one of the sectors of the commutator, and starting at this point measure the ohmic resistance between every two consecutive contact plates. The resistances observed should correspond to the following tables.

b. If the resistances thus measured are normal, measure the resistance of the entire armature between the brushes by touching the brush carriers with the contact pins, turning the armatures slowly by hand. The deviations measured should not exceed 15 % of the normal resistance.

2. Inductor Coils

Measure the ohmic resistance of the inductor coils between the two leads. The values measured correspond to the indications contained in our tables.

If, when testing the armature as described under "a", or when checking the inductor coils, it is found that one or more of the resistances measured are nil, or are considerably below the figures given in our tables, this means that the coil or the respective coils are short-circuited. If the resistance measured is considerably higher, the respective coil or coils are ruptured.

D. Intermittent Break-Downs and Irregular Speeds

It may occur that the speed of a motor varies after it has been in use for some time. It may also change abruptly for no apparent reason. This can be caused by a temporary short-circuit in one of the inductor coils or in the armature, provided no cause for this can be found in the mechanical part. Such short-circuits are very hard to find out with the Ohmmeter. In these rare instances, it is best to look for the cause of the defect by first changing the armature; if this does not help, the inductor coils must be changed one after the other.

CHANGING THE VOLTAGE

The following tables may be consulted for changing the voltage. They show which parts have to be exchanged. The armatures can be used for various motor groups (example : armature no. 722'101 for our 1952, 1958 and 1959 models can be used for groups A and B). This also holds good for the rheostat, which in the two above-mentioned cases has a resistance of 126 and is marked in yellow. In such cases it is only necessary to replace the inductor coils or the complete inductor for changing the voltage.

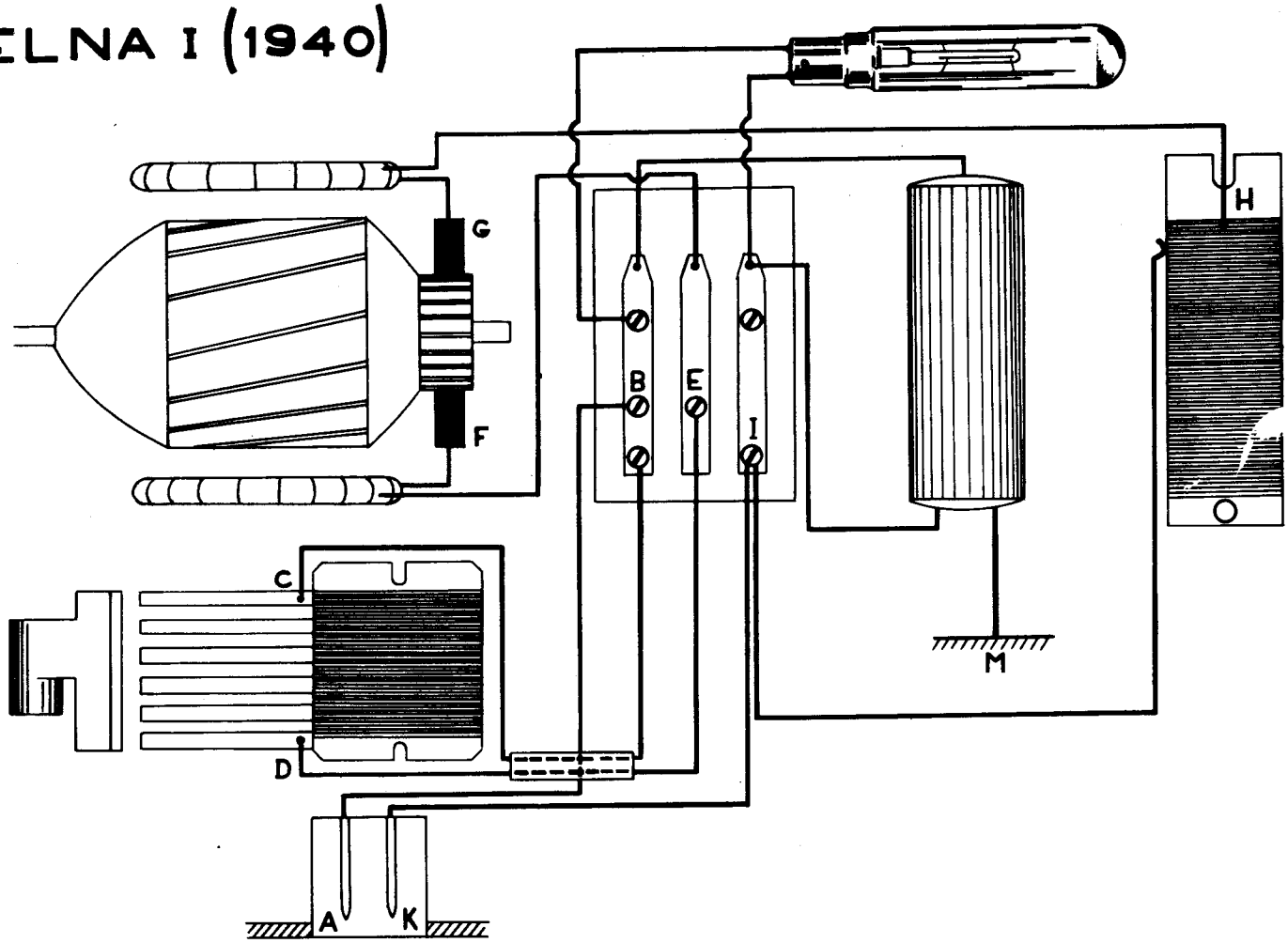
TESTING THE MOTORS

For testing the motor of a first ELNA, the motor pinion should be replaced by a turbine 12'002. To test a motor for our 1952, 1958 and 1959 models, a turbine 12'023 should be fitted in place of the friction wheel.

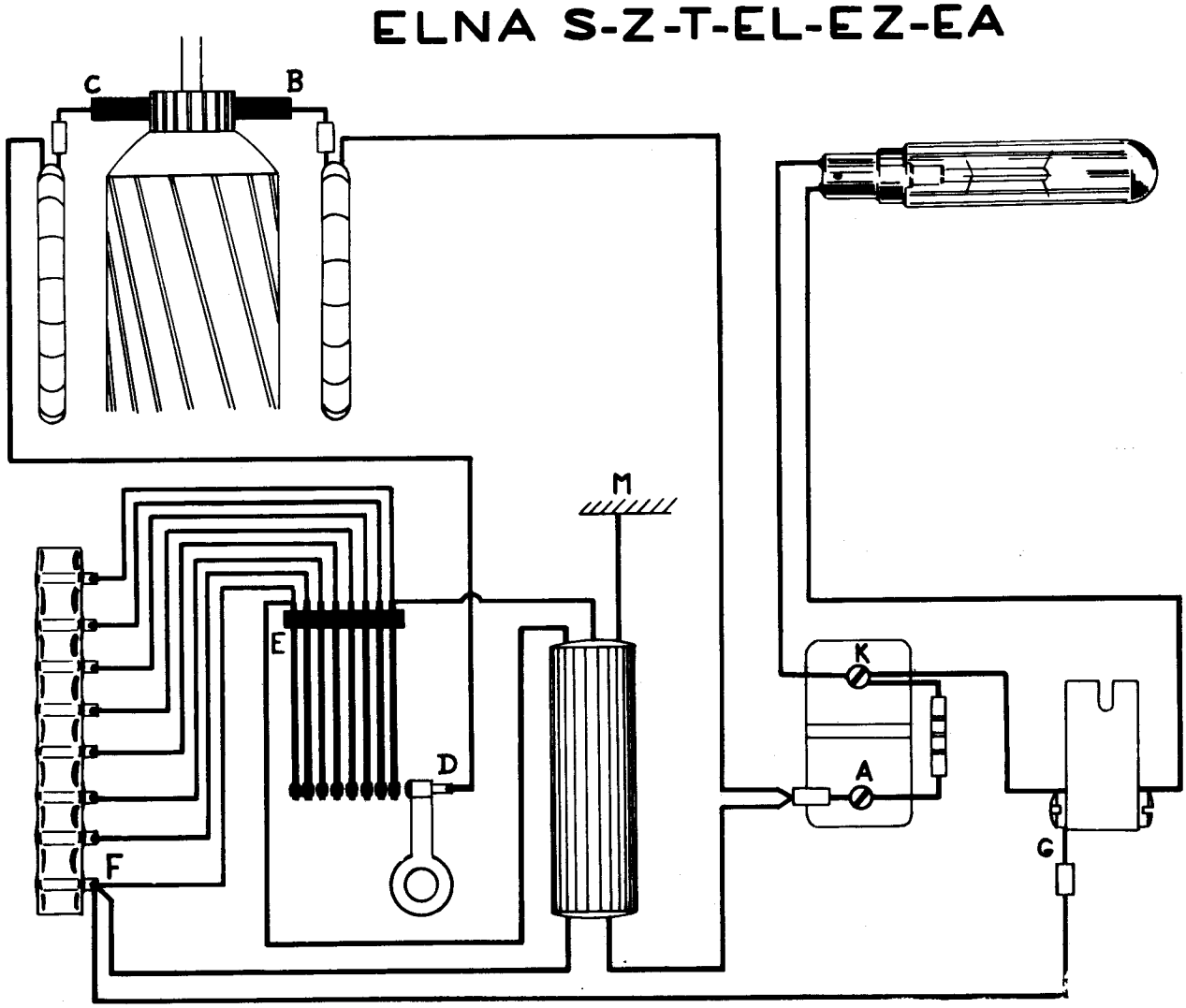
After the motor being tested has been allowed to run for five minutes at the nominal voltage of its group, it should attain <u>at least the following speed</u> :

TAVARO motors	500'890	6000 r.p.m.
	500'958	
	500'970	
TAVARO motors for models 1952, 1958 and 1959		6500 r.p.m.

ELNA I (1940)



ELNA S-Z-T-EL-EZ-EA



Motors for ELNA I - Groups I to VII

Group	Voltage	Armature	Inductor	Colour short insul.	Rheostat	Colour	Adjustable Rheostat	Colour
I	110-125/~	Drawing no. 500'899 Resistance 9,5-15 Ω	Drawings nos. 500'550 & 500'560 Resistance 22-24Ω	brown	Drawing no. 500'940 Resistance 200 Ω	not marked	Drawing no. 500'957 Resistance 300 Ω	not marked
II	110/= 120-130/~	Drawing no. 500'899 Resistance 9,5-15 Ω	Drawings nos. 500'551 & 500'561 Resistance 36-38Ω	yellow	Drawing no. 500'941 Resistance 250 Ω	not marked	Drawing no. 500'957 Resistance 300 Ω	not marked
III	200-250/~	Drawing no. 500'899 Resistance 9,5-15 Ω	Drawings nos. 500'553 & 500'563 Resistance 112-120 Ω	red	Drawing no. 500'942 Resistance 600 Ω	red	Drawing no. 500'961 Resistance 600 Ω	red
IV	220-250/= 230/25	Drawing no. 500'899 Resistance 24-35 Ω	Drawings nos. 500'554 & 500'564 Resistance 158-164 Ω	blue	Drawing no. 500'943 Resistance 1250 Ω	blue	Drawing no. 500'961 Resistance 600 Ω	red
V	120-130/= 145-160/~	Drawing no. 500'899 Resistance 9,5-15 Ω	Drawings nos. 500'552 & 500'562 Resistance 50-54 Ω	green	Drawing no. 500'942 Resistance 600 Ω	red	Drawing no. 500'957 Resistance 300 Ω	not marked
VI	220/~/=	Drawing no. 500'899 Resistance 24-35 Ω	Drawings nos. 500'553 & 500'563 Resistance 112-120 Ω	red	Drawing no. 500'944 Resistance 900 Ω	green	Drawing no. 500'961 Resistance 600 Ω	red
VII	220/~	Drawing no. 500'899 Resistance 9,5-15 Ω	Drawings nos. 500'555 & 500'565 Resistance 87-91,5 Ω	ochre	Drawing no. 500'944 Resistance 900 Ω	green	Drawing no. 500'961 Resistance 600 Ω	red

Motors for ELNA I - Groups A to E

Group	Voltage	Armature	Inductor	Colour short insul.	Rheostat	marked	Adjustable Rheostat	marked
A	110-120/~/=	Drawing no. 500'963 Resistance 10-15 Ω	Drawings nos. 500'973 & 500'974 Resistance 19-21 Ω	brown	Drawing no. 500'975 Resistance 300 Ω	A	Drawing no. 500'976 Resistance 300 Ω	A
B	125-130/~/=	Drawing no. 500'963 Resistance 10-15 Ω	Drawings nos. 500'973 & 500'974 Resistance 38-41 Ω	yellow	Drawing no. 500'975 Resistance 350 Ω	B	Drawing no. 500'976 Resistance 350 Ω	B
C	135-160/~	Drawing no. 500'963 Resistance 10-15 Ω	Drawings nos. 500'973 & 500'974 Resistance 53-55 Ω	green	Drawing no. 500'975 Resistance 400 Ω	C	Drawing no. 500'976 Resistance 400 Ω	C
D	220/~/=	Drawing no. 500'963 Resistance 24-36 Ω	Drawings nos. 500'973 & 500'974 Resistance 112-120 Ω	red	Drawing no. 500'975 Resistance 1000 Ω	D	Drawing no. 500'976 Resistance 950 Ω	D
E	225-250/~/=	Drawing no. 500'963 Resistance 24-36 Ω	Drawings nos. 500'973 & 500'974 Resistance 124-130 Ω	blue	Drawing no. 500'975 Resistance 1000 Ω	E	Drawing no. 500'976 Resistance 950 Ω	E

Motors for 1952, 1958 and 1959 Models with Knee Lever

Group	Voltages	Armature	Inductor	Colour short insul.	Rheostat	Colour
A	110-120/~/=	Drawing no. 722'101 Resistance 4-6 Ω	4,5-6 Ω	brown	6 × 21 = 126 Ω	yellow
B	125-130/~/=	Drawing no. 722'101 Resistance 4-6 Ω	8,5-10 Ω	yellow	6 × 21 = 126 Ω	yellow
C	135-160/~	Drawing no. 722'102 Resistance 8-11 Ω	9-11 Ω	green	6 × 36 = 216 Ω	green
D	220/~/=	Drawing no. 722'103 Resistance 15-25 Ω	21-24 Ω	red	6 × 85 = 510 Ω	red
E	225-250/~/=	Drawing no. 722'103 Resistance 15-25 Ω	25-28 Ω	blue grey	6 × 85 = 510 Ω	red
F	32/=	Drawing no. 722'104	Drawing no. 772'146	black	6 × 1,7 = 10,2 Ω	black
G	24/=	Drawing no. 722'105	Drawing no. 772'147	green black	6 × 1 = 6 Ω	white
H	20/=	Drawing no. 722'105	Drawing no. 772'148	white	6 × 1 = 6 Ω	white

Motors for 1952, 1958 and 1959 Models with Foot Control

Group	Voltages	Armature	Inductor	Colour of short insul.
A	110-120/~/=	Drawing no. 722'101 Resistance 4-6 Ω	4,5-6 Ω	brown
B	125-130/~/=	Drawing no. 722'101 Resistance 4-6 Ω	8,5-10 Ω	yellow
C	135-160/~	Drawing no. 722'102 Resistance 8-11 Ω	9-11 Ω	green
D	220/~/=	Drawing no. 722'103 Resistance 15-25 Ω	21-24 Ω	red
E	225-250/~/=	Drawing no. 722'103 Resistance 15-25 Ω	25-28 Ω	blue grey

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ELNA

E 3

MECHANICAL HANDBOOK

S - Z - T - EL - E Z - E A

TAVARO S.A.

GENEVA

CONTENTS

S = Supermatic
Z = Zig Zag
T = Transforma

EL = ELNA
EZ = ELNA Zig Zag
EA = ELNA Automatic

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INTRODUCTION

This chapter is intended as a memory-aid for the technical staff.

Nevertheless, we can but recommend to all who have to do with these questions:

TO STOP AND THINK FIRST AND TO ACT AFTERWARDS!

The opposite only very seldom leads to good results.

In other words, one should always try to LOCALIZE the defect, keeping in mind that very often it is the customer who is to blame for it, or even the instructress.

It is in fact useless to "repair" the machine, if the customer persists in using it the wrong way. In many cases, it is preferable to ask the customer to sit down at her machine and to show her a better way of using it. This avoids unpleasant call-backs.

As a general rule, no machine should be brought to the workshop before an instructress or even a salesman has localized the defect. This enables the specialist to intervene efficiently.

Only in quite exceptional cases, is the machine dismantled completely such as for: repainting the casings, cleaning a machine gummed up by the use of an inadequate oil, etc..

As a rule, repairs will be of a rather local nature, i.e. Elnagraph, mechanism of needle bar and thread take-up lever or rotary hook, on the other hand, motor and sewing light or also cloth feed and thread tensions.

As a consequence, it is in such cases often only necessary to dismantle partially, which generally amounts almost to nothing, if one knows how to tackle the problem properly. The purpose of this guide is precisely to explain this in a general way.

On the other hand, please remember that the sequence of assembly corresponds in principle, to the reverse dismantling sequence.

The dismantling operations are numbered with light figures and those for reassembling with dark figures.

For adjustments which refer to the various models of our machines, the following abbreviations have been used:

S = Supermatic
Z = Zig Zag
T = Transforma
EL = ELNA
EZ = ELNA Zig Zag
EA = ELNA Automatic

Practical experience has shown that it is preferable to check all adjustments of the machine after a repair, instead of confining oneself to those, which one considers to be necessary.

One never knows!

The following examples are not introduced to replace the portion of the instruction book entitled "Minor Disorders and Remedies", but rather to complement it.

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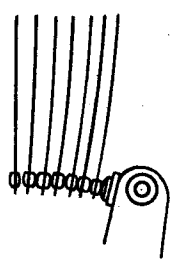
E L I M I N A T I O N O F M I N O R D I S O R D E R S

MACHINE SLOW	CHECK: Tension of machine and electricity supply Commutator and carbon brushes Free running Oiling. Bad oil Hard points Swelling of old nylon gears Rotary hook - cleanliness Contactor - contact on all blades Driving belt too tight Slipping of friction wheel
MACHINE TOO FAST	CHECK: Tension of machine and electricity supply Contactor: disconnect last (one before last) blade by changing position of Phillips screw on contact lever 
MACHINE STARTS TO RUN TOO LATE AND VERY FAST	CHECK: Rheostat, by testing the motor with the bobbin winder in action Possible hard point Slippage of the coupling When sewing heavy or stiff material, it is more important than ever to start the machine with the thread take-up descending
MOTOR RUNS IRREGULARLY	CHECK: The motor only starts to run in certain angular positions: The armature is probably shorted Hard point in the Elnagraph: (adjust play of Elnagraph pinion) Whether coupling slips

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Repairs

E L I M I N A T I O N O F M I N O R D I S O R D E R S

MOTOR DOES NOT RUN	CHECK: Whether the current reaches the machine Electric cord and connections Whether the sewing light functions Motor alone Motor connections Carbon brushes and commutator Possible shorting of inductor or armature
SEWING LIGHT DOES NOT FUNCTION	CHECK: Whether current reaches machine Switch Connections Bulb Contacts
MACHINE NOISY	CHECK: Maintenance - oiling Rotary hook Localize noise in order to eliminate it, in most cases by reducing clearances
MACHINE BLOCKED OR HARD POINT	CHECK: Rotary hook Foreign bodies in the machine Adjustment of plays
THREAD BREAKAGE	CHECK: Threading Needle Tensions Rotary hook Upper and lower threads (thread passages) Choice and quality of threads Faulty compensating spring Needle plate - darning plate

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Repairs

E L I M I N A T I O N O F M I N O R D I S O R D E R S

IRREGULAR STITCHING LEFT OUT STITCHES	CHECK: Tension devices (dirty) Needle (badly placed, not pushed up completely, bent) Needle clamp Needle clearance Height of needle bar
DEFECTIVE CLOTH FEED	CHECK: Needle plate (wrongly placed) Height of feed dog Feed dog (dirty) In case of circular cloth feed, check whether the lifter blade is not slightly twisted In exceptional cases, it is possible that exaggerated thread tensions cause a defective cloth feed
VERY FINE MATERIALS	Try to decenter the needle to the left or to the right
BUTTONHOLE DISC	Bent needle
NEEDLE BREAKAGE	CHECK:
a. when sewing forwards	Badly set tensions Customer pulls the work Knotted thread Thread caught in the hook Lower tension badly threaded Upper guard ring displaced Needle twisted while pulling up the thread
b. when sewing backwards	Stitch too long (a seam finished off with short stitches holds better) Speed badly adapted Reversing of cloth feed while the machine is running
c. while darning	Work is moved too abruptly Tensions too strong
d. during embroidery	Badly controlled movement of the hoop Automatic cloth feed Fastening of the Elna-disc

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Repairs

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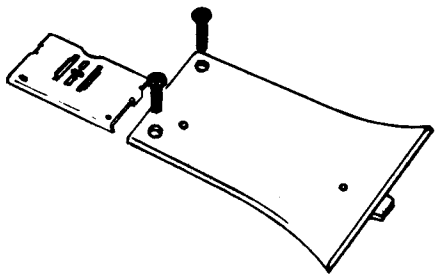
FAULTY SUPPRESSION	CHECK:
a. Radio	Whether no other domestic appliance is at fault
	Condenser
	Wave lengths used
	Contacts
	Self on connections
	Commutator
b. Television	Distortion of the picture
	Sound
	Fitting of self
	Carbon brushes - commutator

REPLACEMENT OF ROTARY HOOK PINION

DISMANTLING

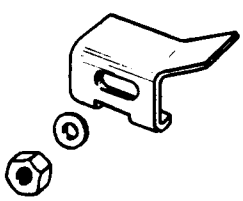
1



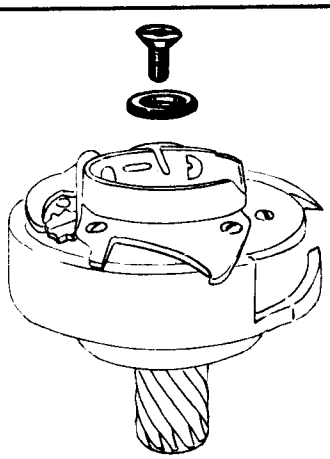
2

Support feed dog with screw-driver to unscrew

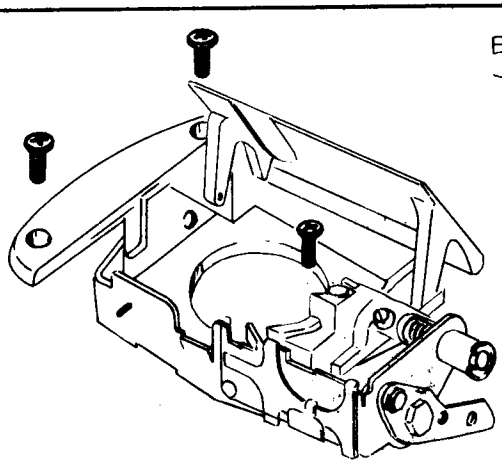
3



4



5



6

To facilitate assembly, first note position of hook pinion

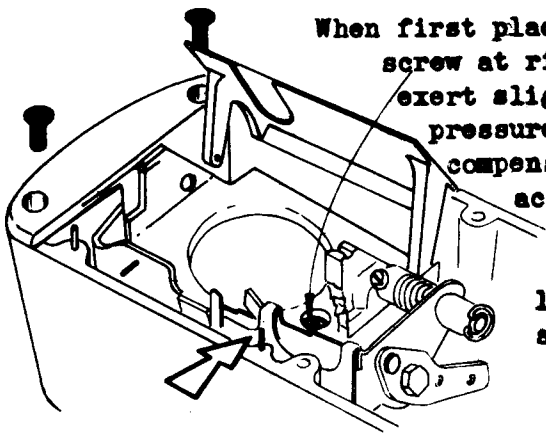
Timing position will thus be more easily located

ASSEMBLY

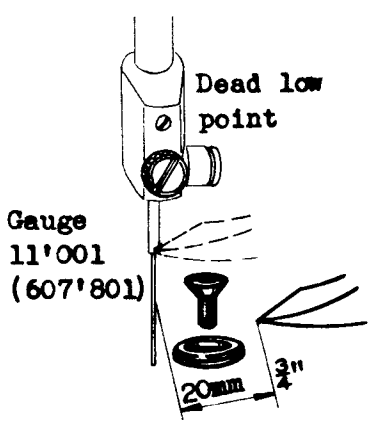
1

2

When first placing screw at right, exert slight pressure to compensate action of release spring



3



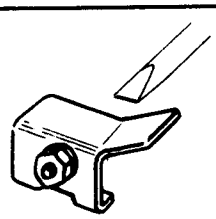
Insert hook Turn point so that it is just behind gauge

Mesh hook and lodge guard ring beak

Refit washer(s) and screw

TIMING: ADJUSTMENT 5

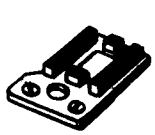
4



Hold SCREW with screw-driver to tighten

ADJUSTMENTS 9-10

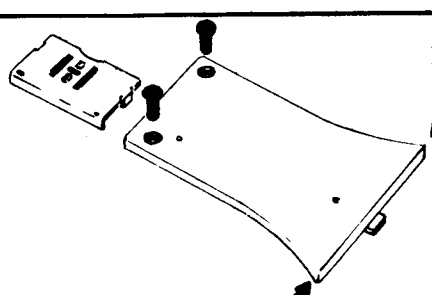
5



Support FEED DOG with large screw-driver to tighten screws

ADJUSTMENT 11

6



Before fastening cover, take care that it fits upper casing

907

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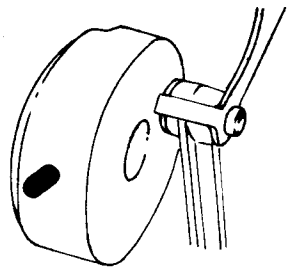
October 1959

Repairs

REPLACEMENT OF DRIVING BELT

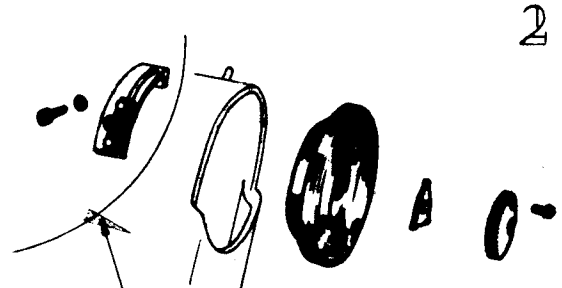
DISMANTLING

1



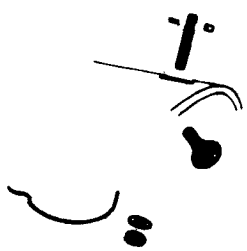
Loosen COUNTER-WEIGHT SCREW

2



Supermatic only

3



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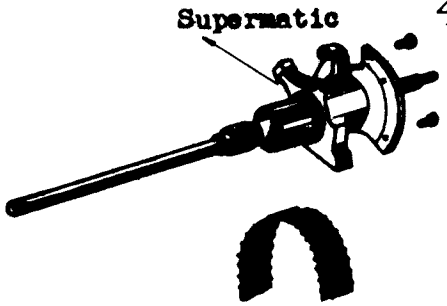
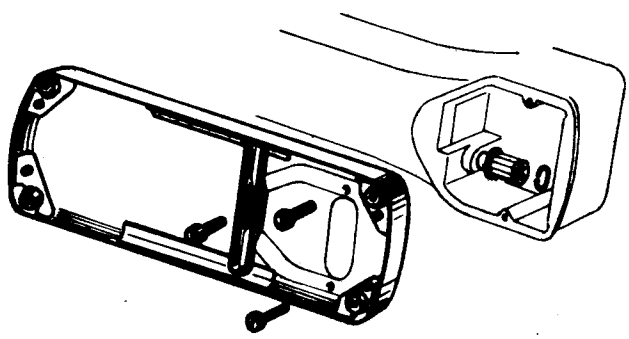
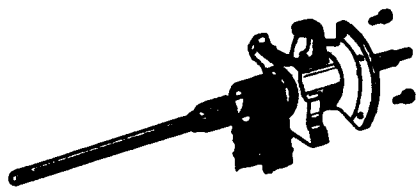


5

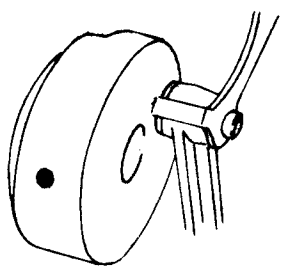


ASSEMBLY

1

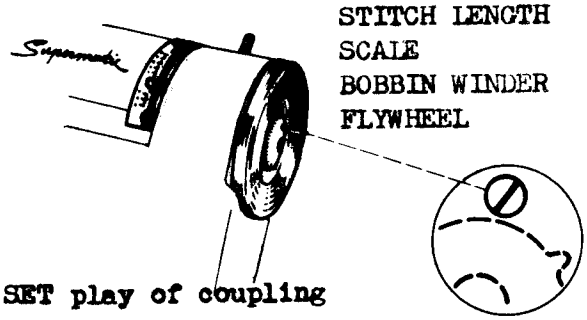


2



The tip of the COUNTERWEIGHT SCREW should be lodged in the hole in the upper shaft
Tighten

3

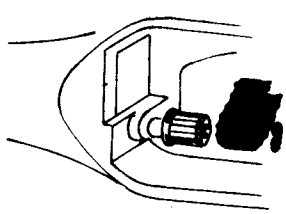


Fix:
STITCH LENGTH SCALE
BOBBIN WINDER FLYWHEEL

SET play of coupling

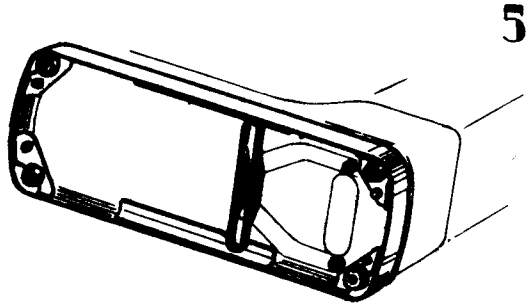
4

NEEDLE BAR down
FEED GEAR SET 25 or 26 or 27 or 28



TIMING OF HOOK: ADJUSTMENT 5

5



CHECK: ADJUSTMENT 18

REPLACEMENT OF CHECK SPRING
UPPER TENSION

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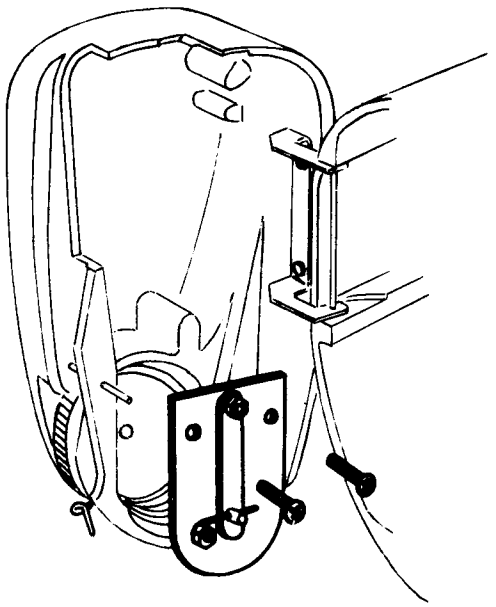
October 1959

Repairs

DISMANTLING

1



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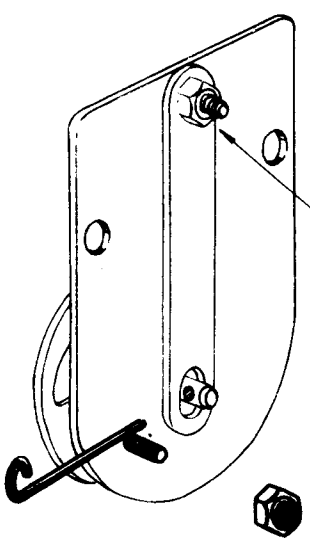
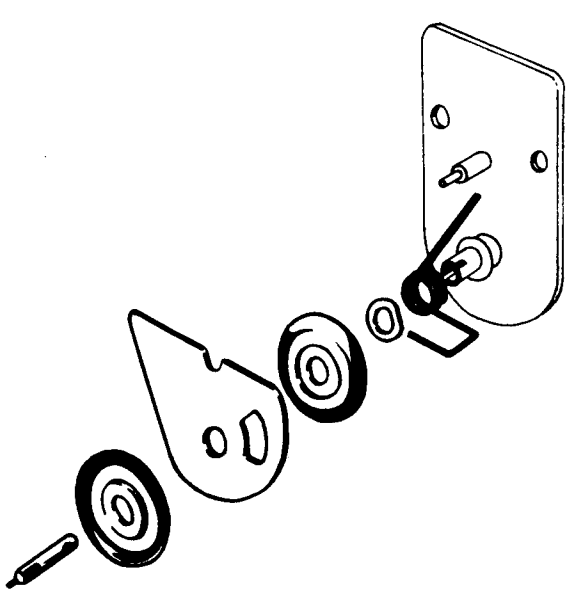


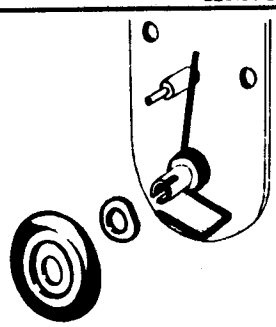
Avoid touching upper nut which adjusts tension

3

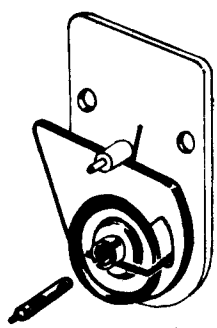


ASSEMBLY

1



2



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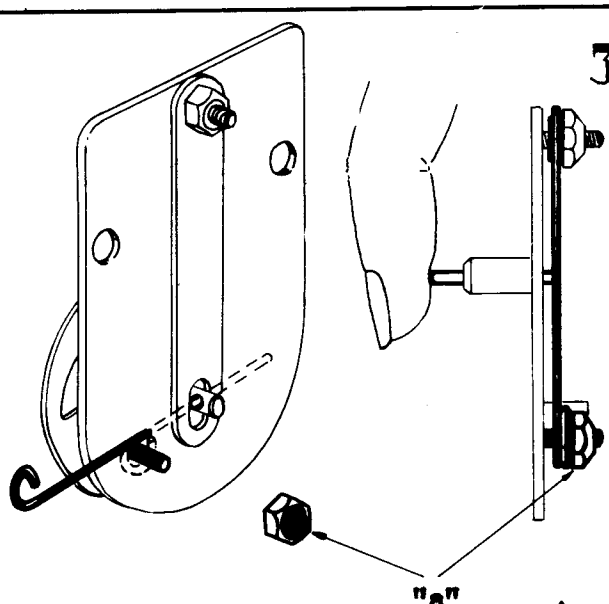
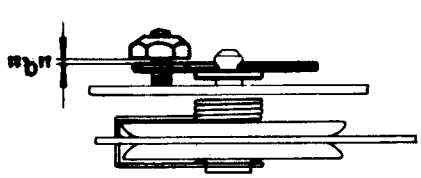


"SEEN FROM A" A

Tighten nut "a" to obtain MINIMUM PLAY "b"

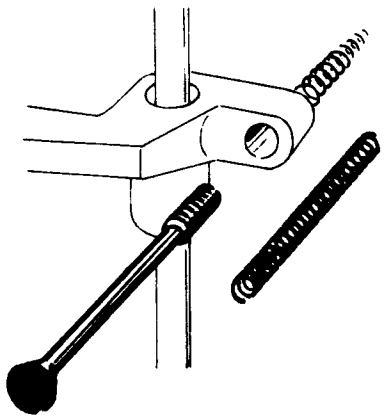


CHECK 21 or 23

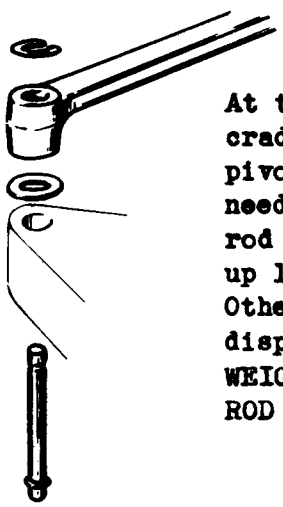
REPLACEMENT OF THREAD TAKE-UP LEVER

DISMANTLING

1



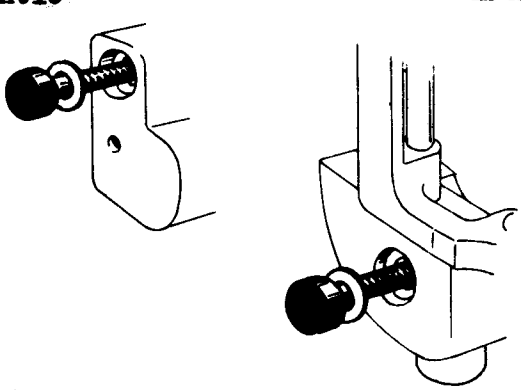
2



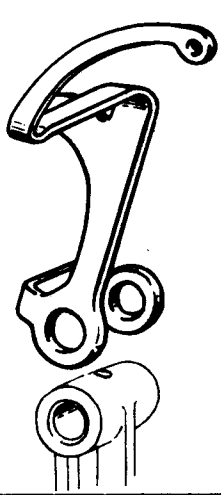
At this point, the cradle can often be pivoted, to remove needle bar connecting rod and thread take-up lever.
Otherwise, try to displace COUNTER-WEIGHT or CONNECTING ROD GUIDE

If unsuccessful continue to dismantle

2a

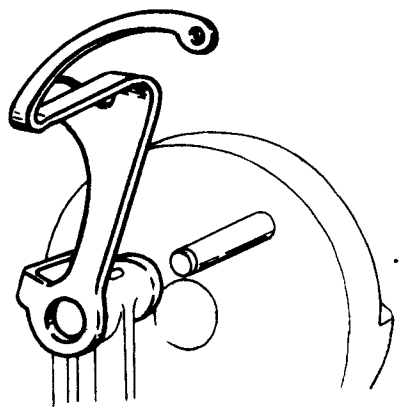


3

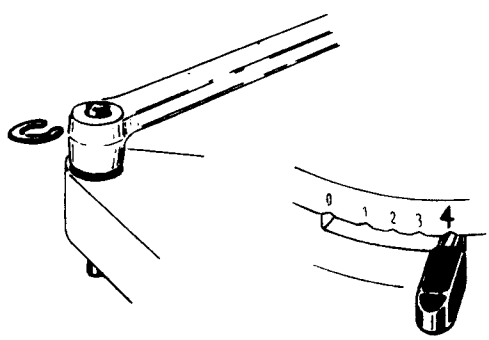


ASSEMBLY

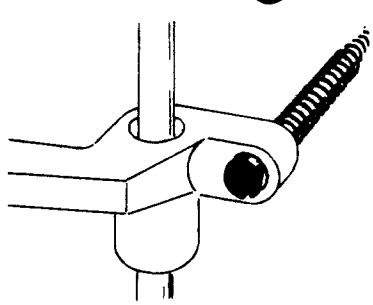
1



2



Adjust play of CRADLE SPRING SCREW (ADJUSTMENT 2)



In case of extensive dismantling SEE ADJUSTMENTS:

1 - 2 - 3 - (4) - 5 - 6

REPLACEMENT OF STITCH WIDTH KNOB S

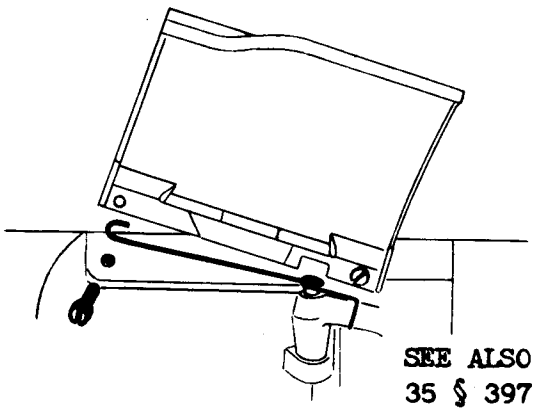
Printed in Switzerland

October 1959

Repairs

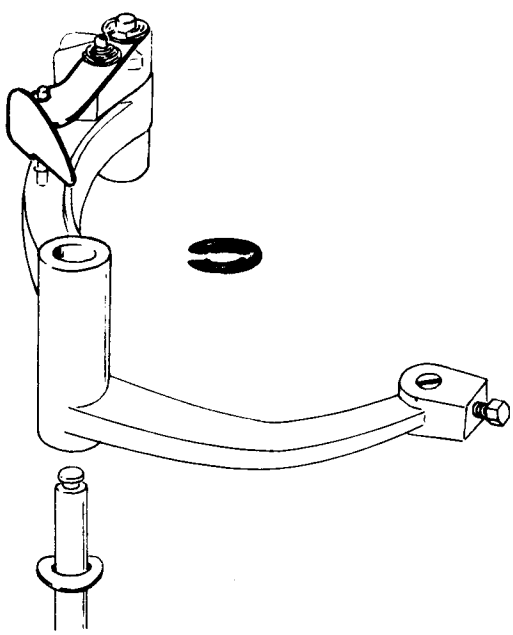
DISMANTLING

1

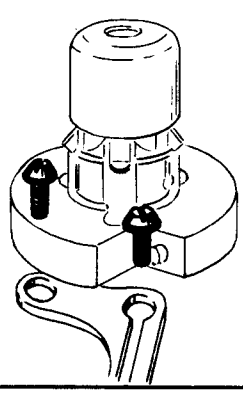


SEE ALSO TIB 35 § 397

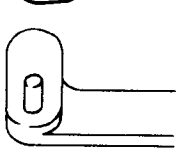
2



3



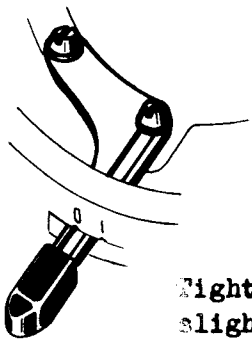
4



Disconnect CRADLE LEVER

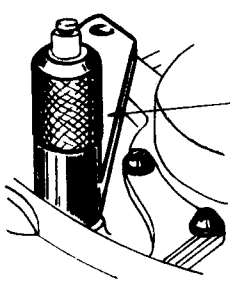
ASSEMBLY

1



Tighten the SCREWS slightly

2

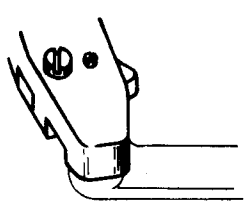


SEE TIB 34 § 371
TIB § 417/4

Gauge 11'025

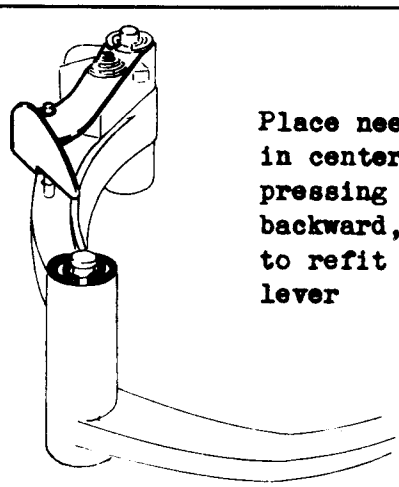
Tighten the SCREWS altogether

3



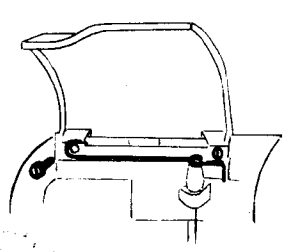
Replace cradle lever

4



Place needle bar in center, by pressing CRADLE backward, in order to refit centering lever

5



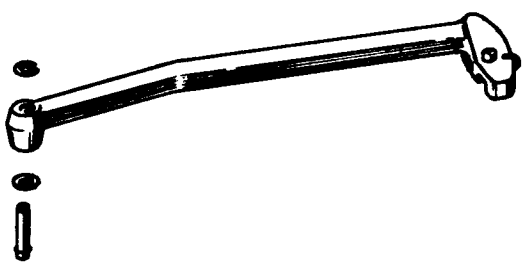
ADJUSTMENTS: 2-3

REPLACEMENT OF STITCH WIDTH KNOB Z

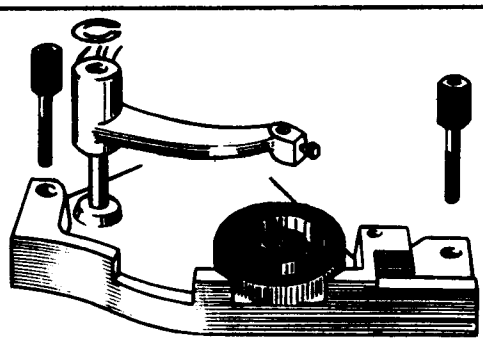
DISMANTLING

1

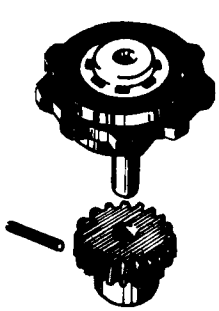
2



3



4



5

ASSEMBLY

1

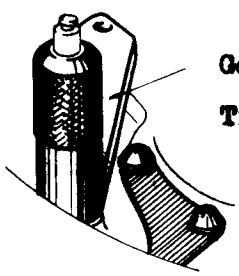
Fasten the screws
without tightening

2

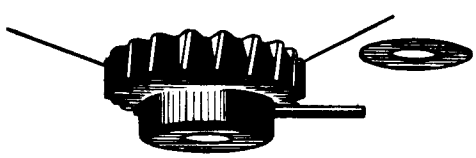
SEE TIB 34 § 371
or § 417/4

Gauge 11'025

Tighten the SCREWS



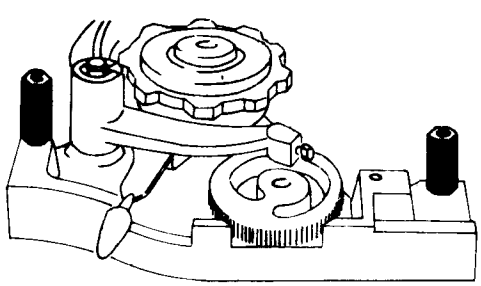
3



Maximal axial play .004" (0,1 mm)

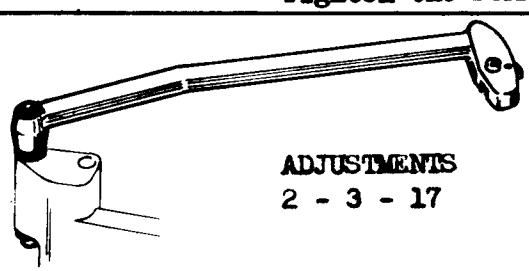
4

Set minimum play between
KLNAGRAPH PINION and WORM



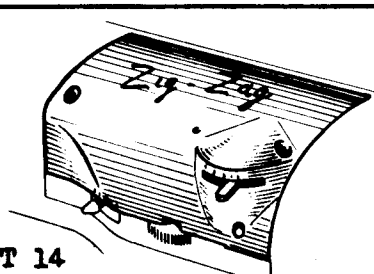
Tighten the SCREWS

5



ADJUSTMENTS
2 - 3 - 17

6



ADJUSTMENT 14
Work cover 11'027

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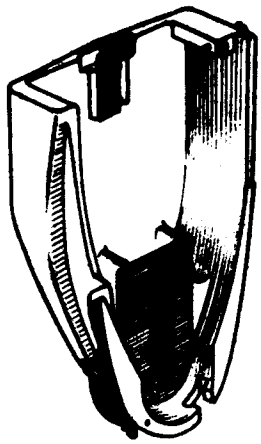
October 1959
Repairs

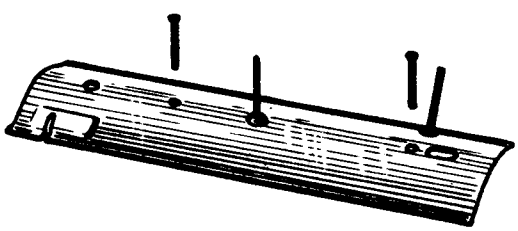
REPLACEMENT OF STITCH WIDTH LEVER EZ

DISMANTLING

1



2



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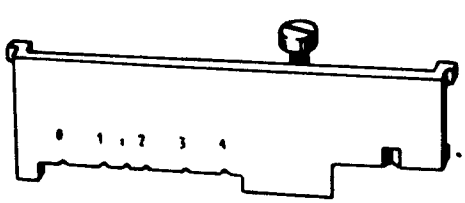

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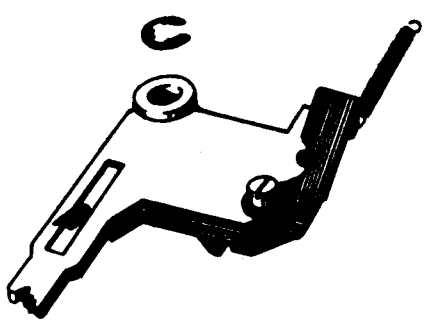
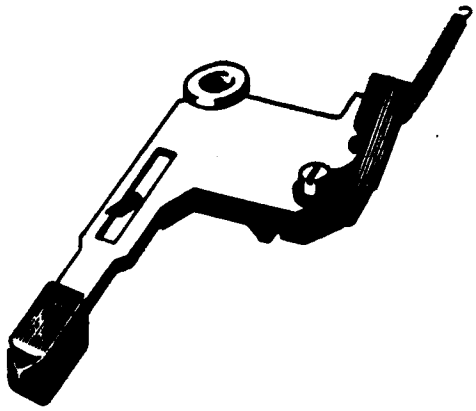


5

ASSEMBLY

1



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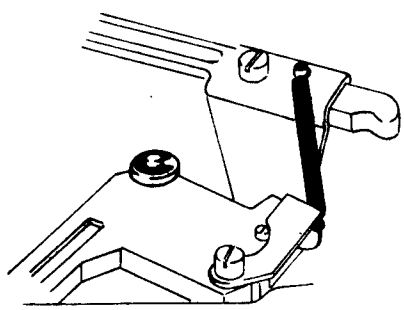
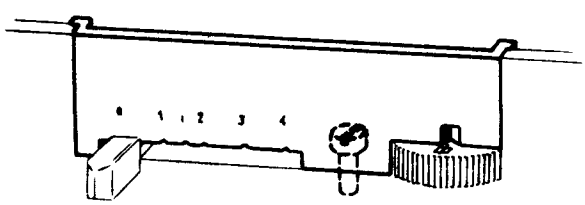
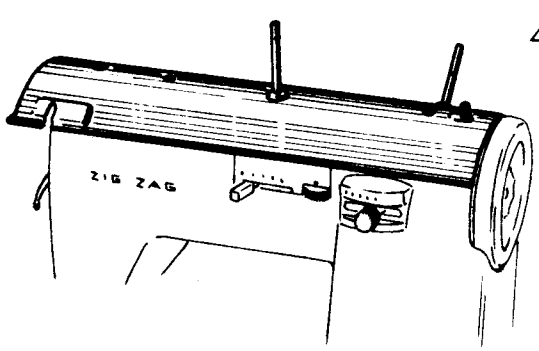


3



ADJUSTMENTS 31, 33

4



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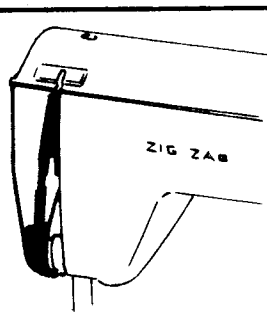

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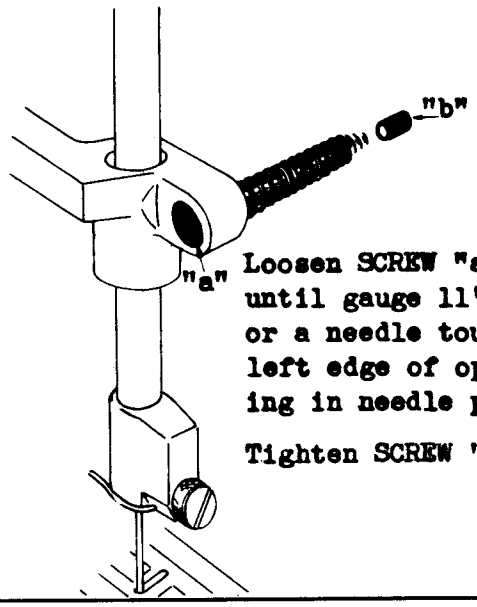
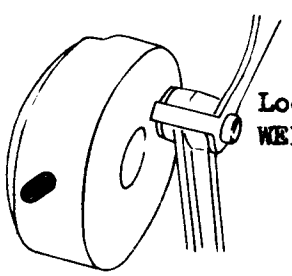
1



Loosen SCREW "a" until gauge 11'001 or a needle touches left edge of opening in needle plate

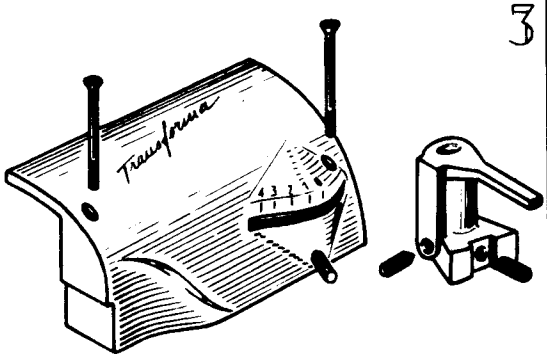
Tighten SCREW "b"

2



Loosen COUNTER-WEIGHT SCREW

3



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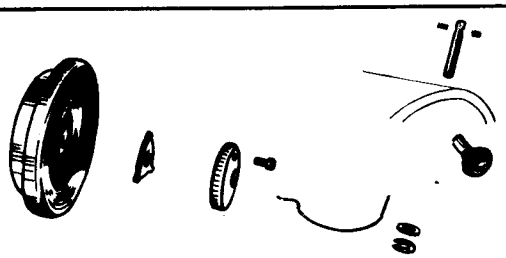

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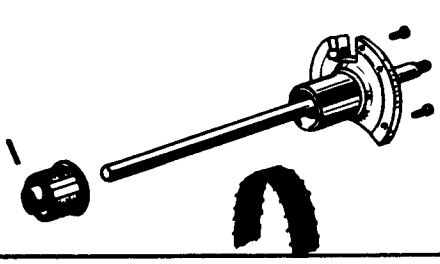

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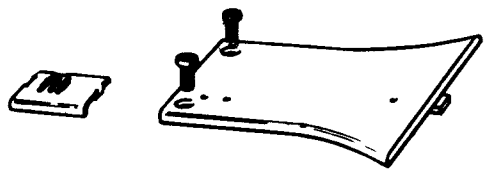

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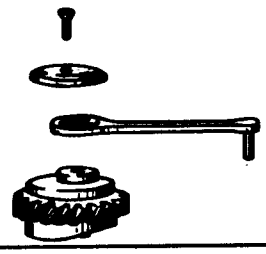

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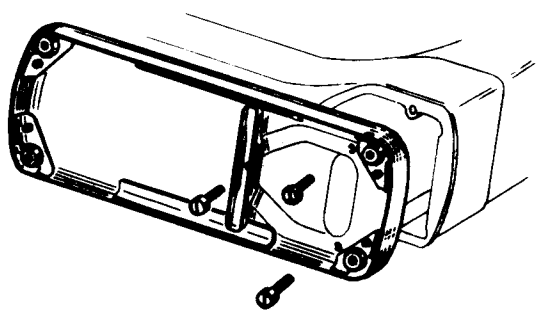
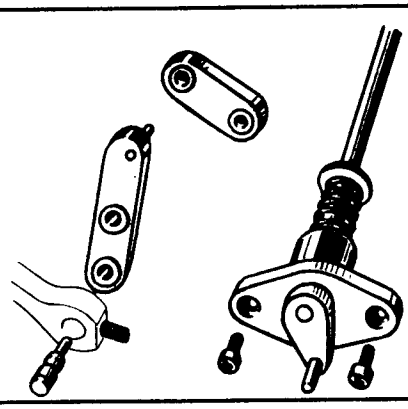


9



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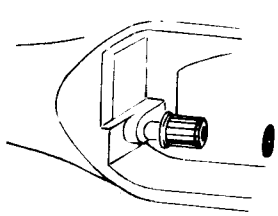

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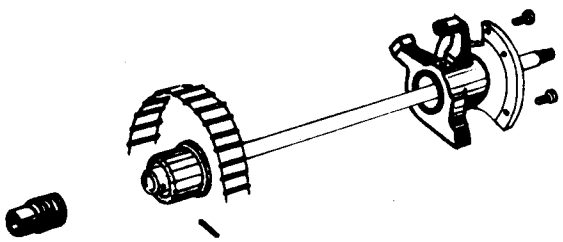
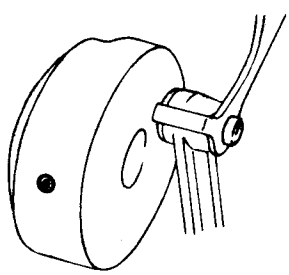
1



Mark of WORM must be opposite hole for COUNTERWEIGHT SCREW

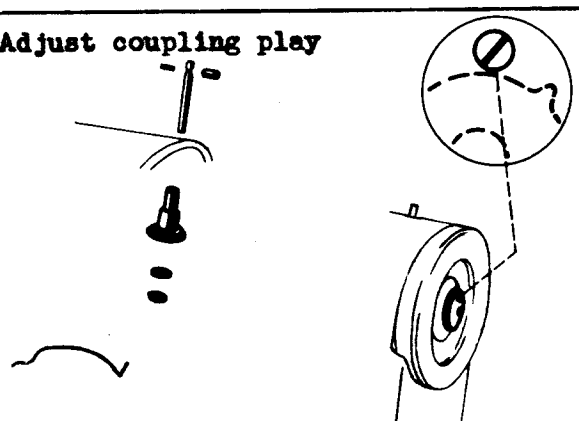
2



The tip of the COUNTERWEIGHT SCREW must penetrate into the hole in the UPPER SHAFT Tighten

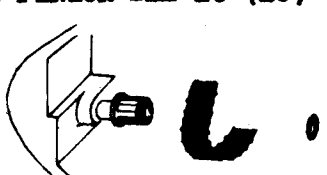
3

Adjust coupling play



4

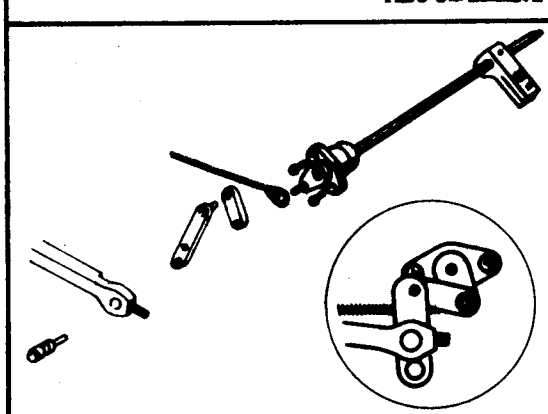
NEEDLE BAR at lowest point
FEED DOG PINION SEE 26 (25)



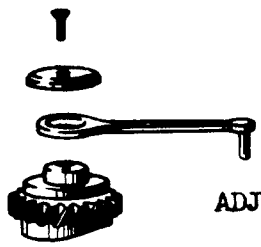
TIMING OF HOOK

ADJUSTMENT 5

5

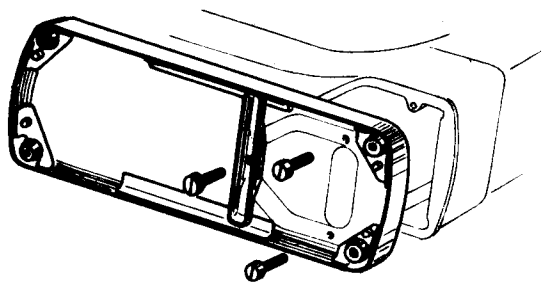


6



ADJUSTMENT 26 (25)

7



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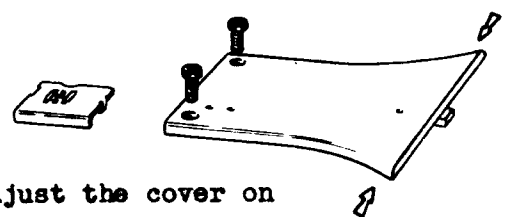
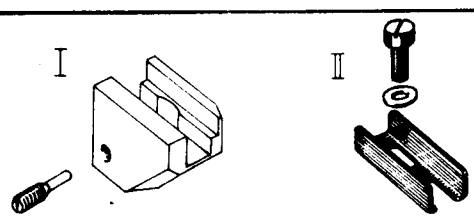


Adjust the cover on the upper casing before fastening it

9



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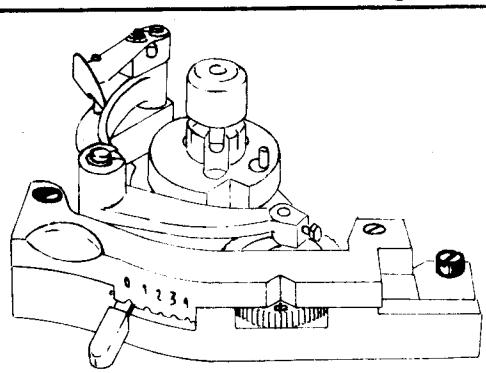
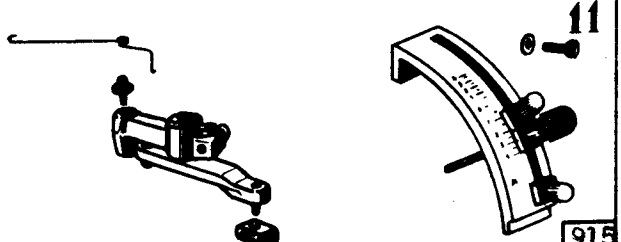


Set minimum play between ELNAGRAPH PINION and WORM

11



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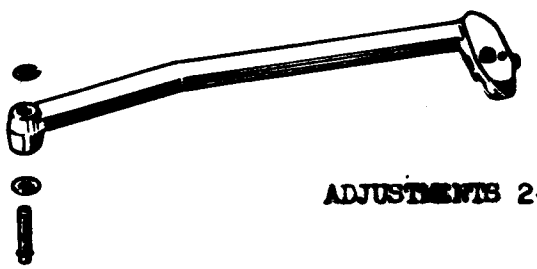
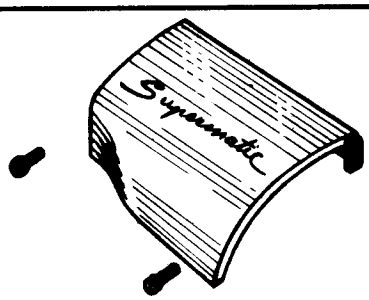


ADJUSTMENTS 2-3

13



14

MAKE ADJUSTMENTS

13 - 17 - 18 - 19

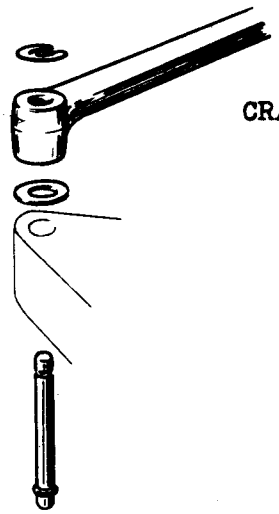
CHECK

1 - 5 - 6 - 7 - 9 - 10 - 11 - 12

CONVERSION ZIG-ZAG-SUPERMATIC

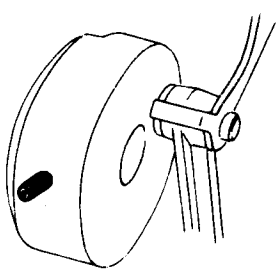
DISMANTLING

1



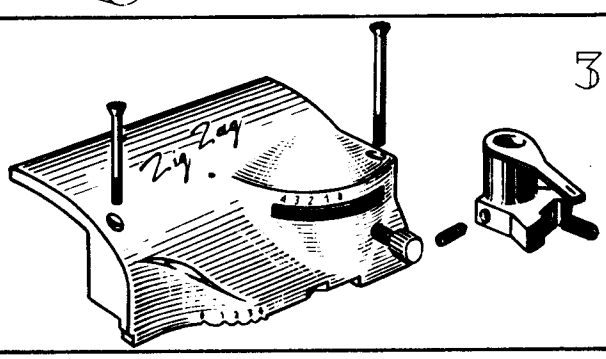
CRADLE LEVER

2



Loosen COUNTER-WEIGHT SCREW

3



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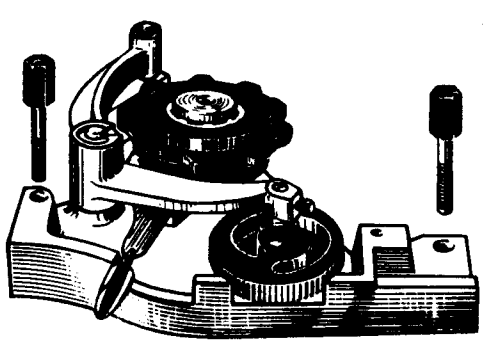

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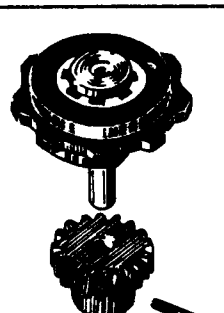

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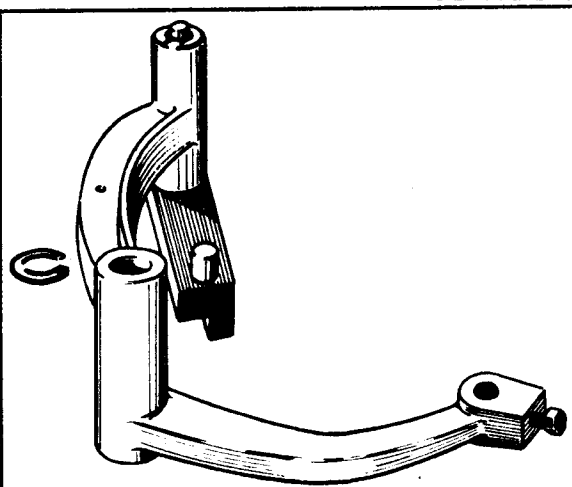

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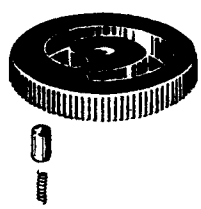

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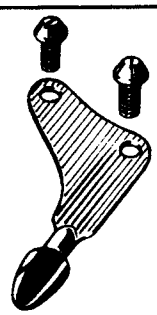

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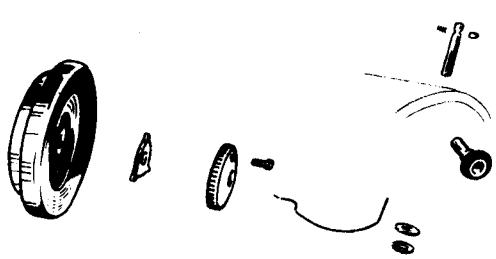

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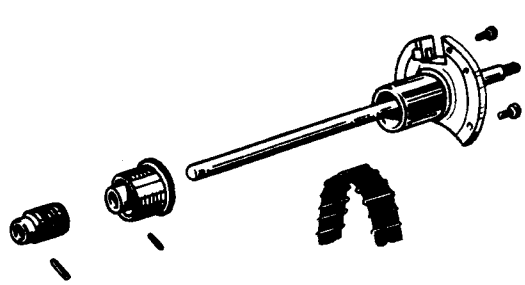

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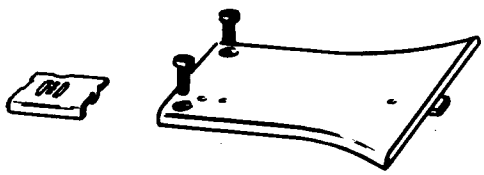
11



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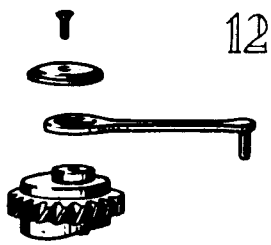

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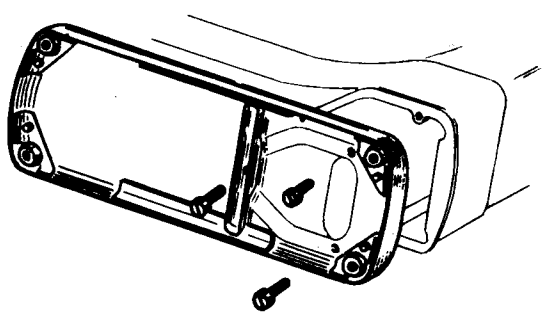

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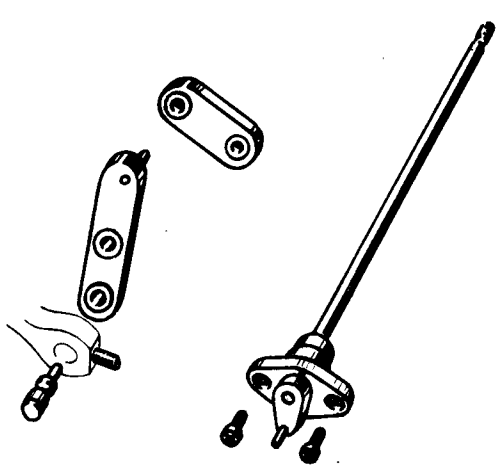

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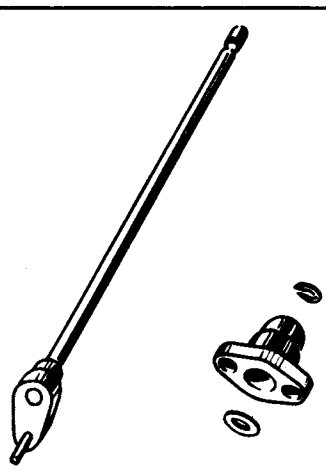

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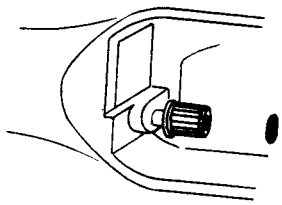

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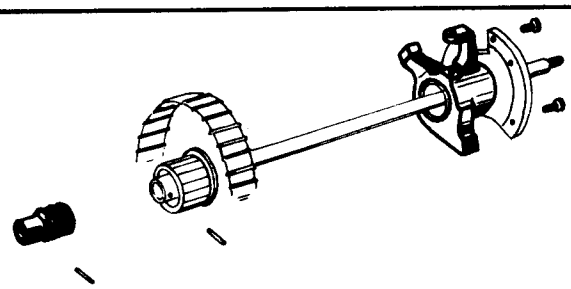
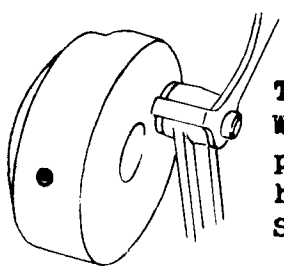
Repairs

1



Mark of WORM must be opposite hole for COUNTERWEIGHT

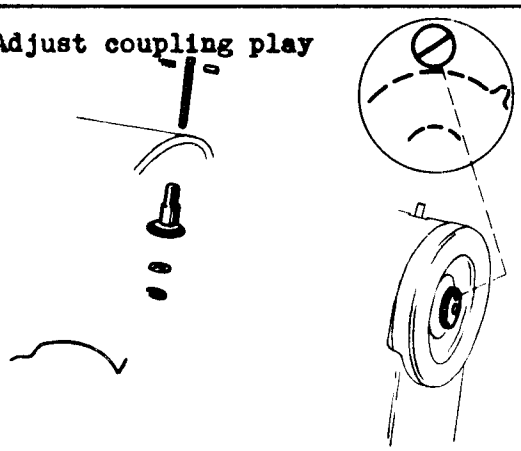
2



Tip of COUNTER-WEIGHT SCREW must penetrate into hole of UPPER SHAFT. Tighten

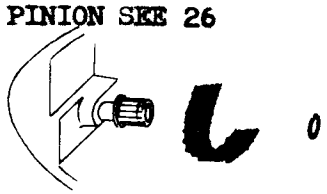
3

Adjust coupling play



4

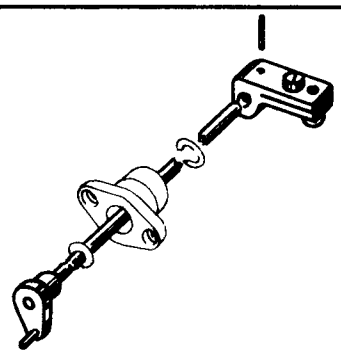
NEEDLE BAR at lowest point
FEED DOG PINION SEE 26



TIMING OF HOOK

ADJUSTMENT 5

5



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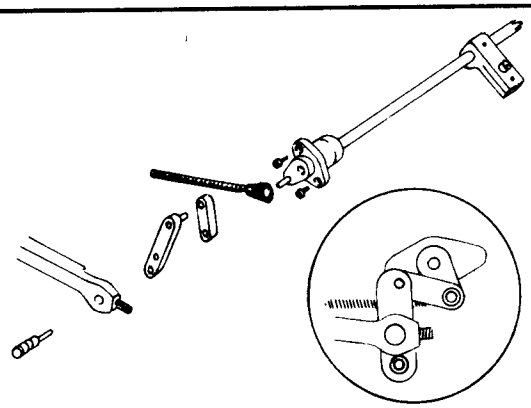

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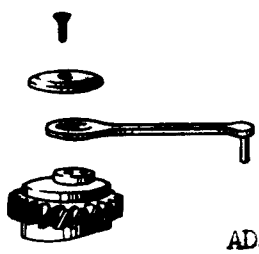
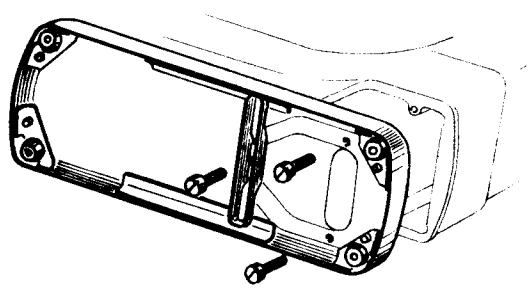


ADJUSTMENT 26

8



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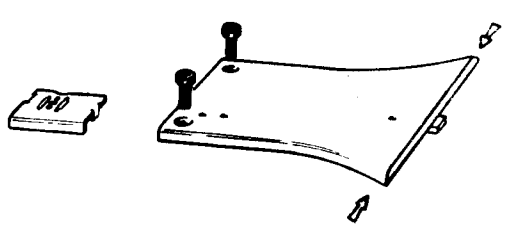
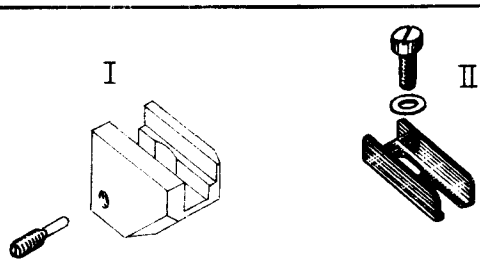


Before fastening cover, adjust it to upper casing

10



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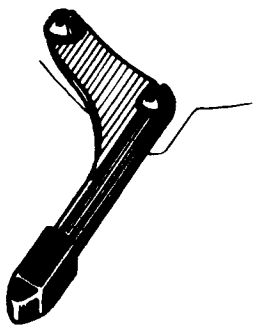
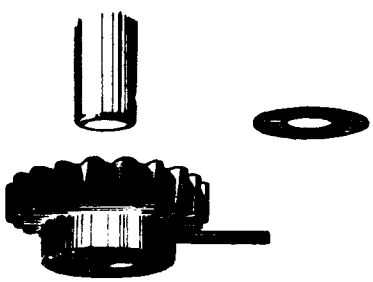
Slightly tighten the SCREWS **11**

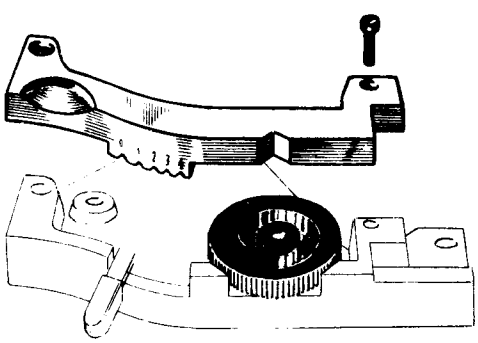


12



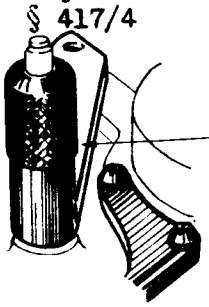
Maximum axial play .004" (0,1 mm)

13



SEE TIB 34 § 371
TIB § 417/4

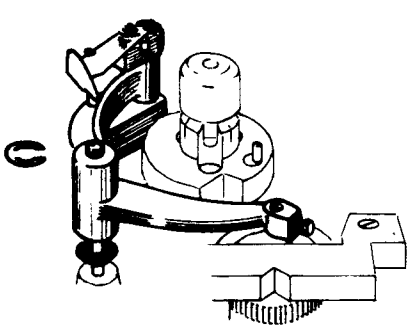
14



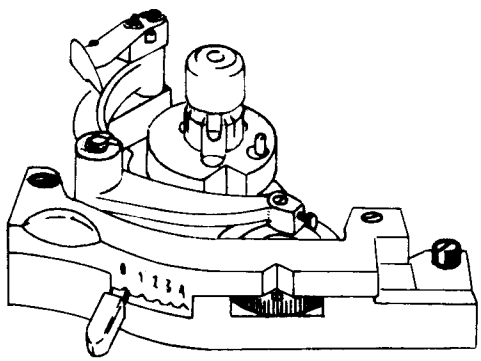
Gauge 11'025

Tighten the SCREWS

15

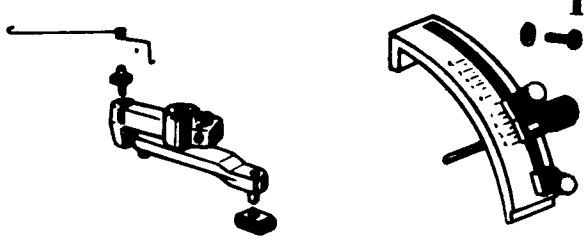


16

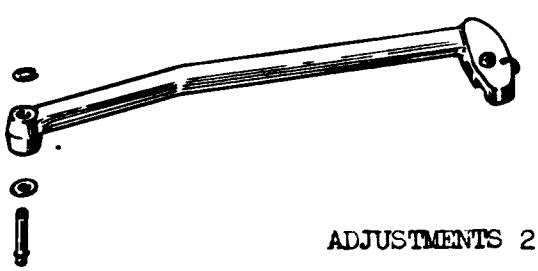


Adjust minimum play between EIMAGRAPH PINION and WORM

17

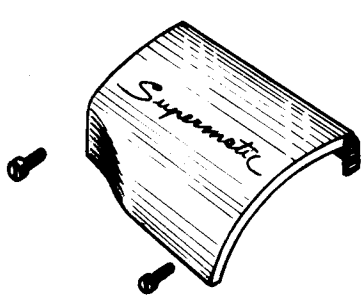


18



ADJUSTMENTS 2-3

19



ADJUSTMENTS

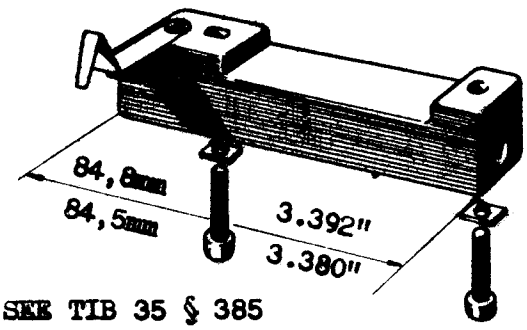
13 - 17 - 18 - 19

CHECK

1 - 5 - 6 - 7 - 9 - 10 - 11 - 12

KNEE LEVER SEIZED

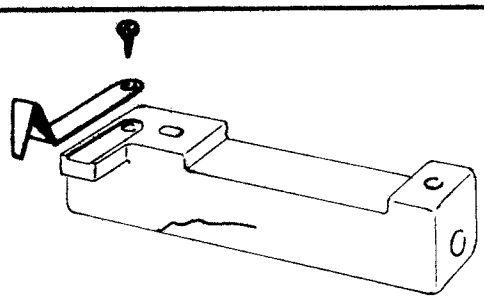
1



SEE TIB 35 § 385

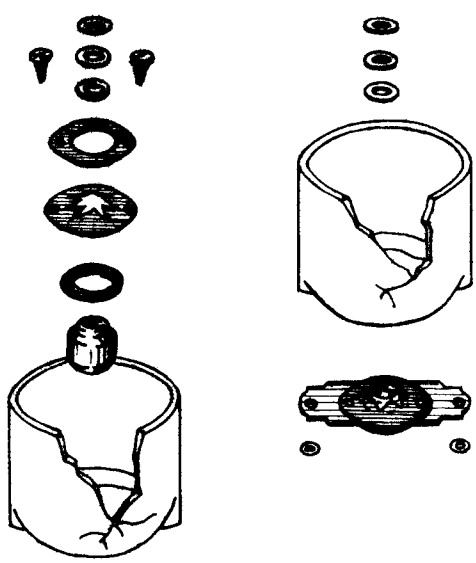
REPLACEMENT OF MOTOR SUPPORT

2



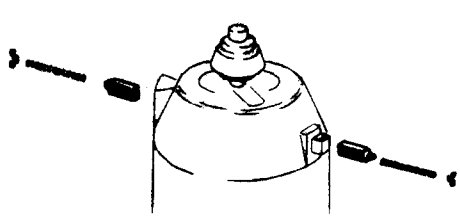
REPLACEMENT OF LOWER MOTOR CASING

3



REPLACEMENT OF CARBON BRUSHES

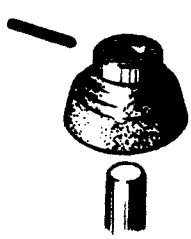
4



REPLACEMENT OF FRICTION WHEEL

Is sometimes possible without removing the motor

5



Printed in Switzerland

October 1959

REPLACEMENT OF ARMATURE

6

1, 3 assembled,
4, 5

REPLACEMENT OF INDUCTOR ASSEMBLED

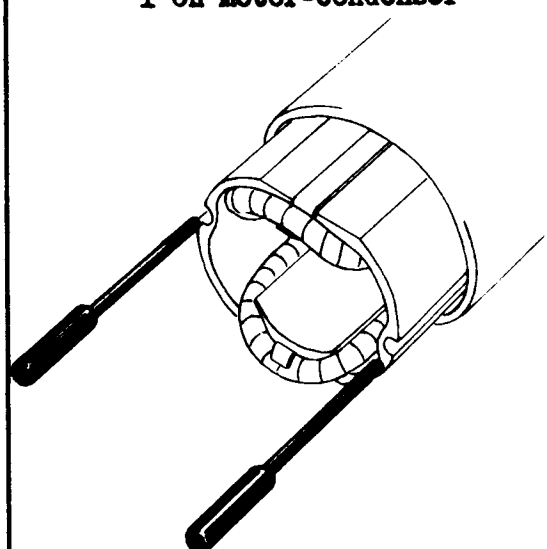
(Changing of voltage - short circuit)

7

1, 3 assembled,
4, 5, 6

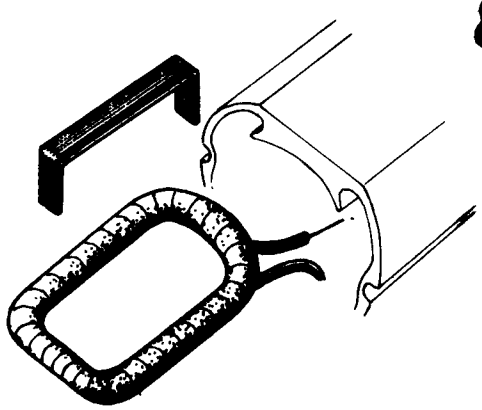
Unsolder 4 wires of inductor coils i.e.

2 on carbon brushes
1 on contactor
1 on motor-condenser

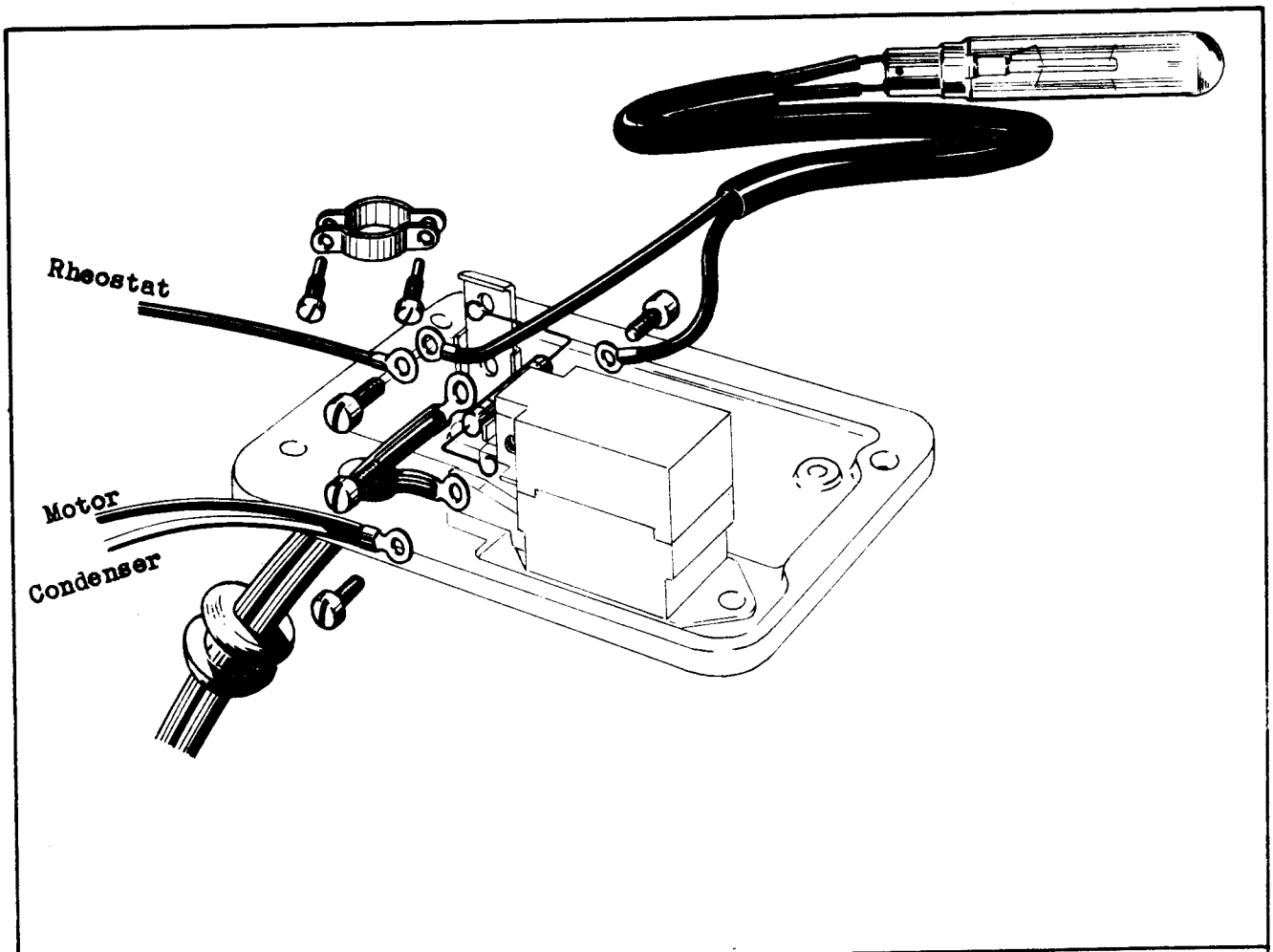


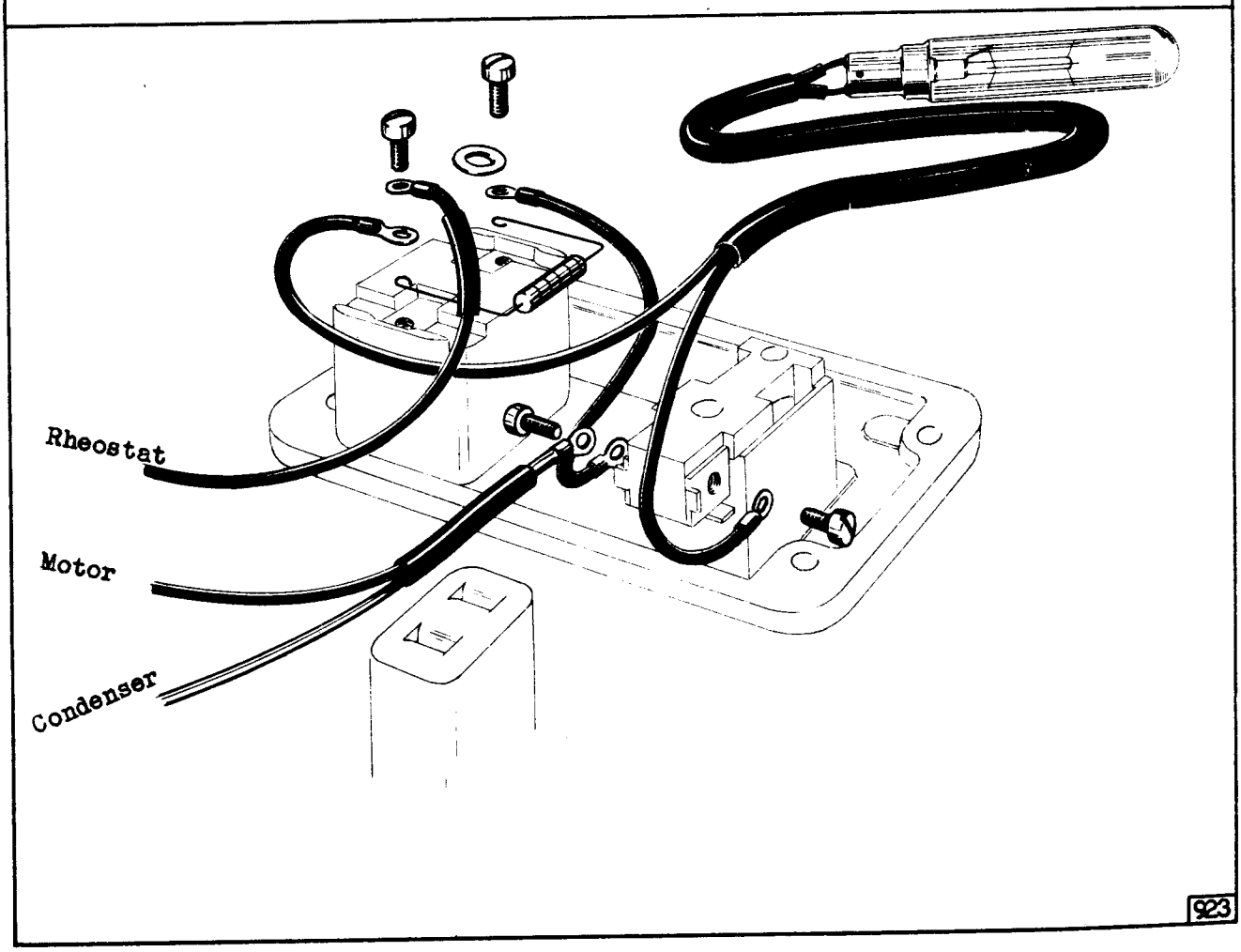
REPLACEMENT OF INDUCTOR COILS

8



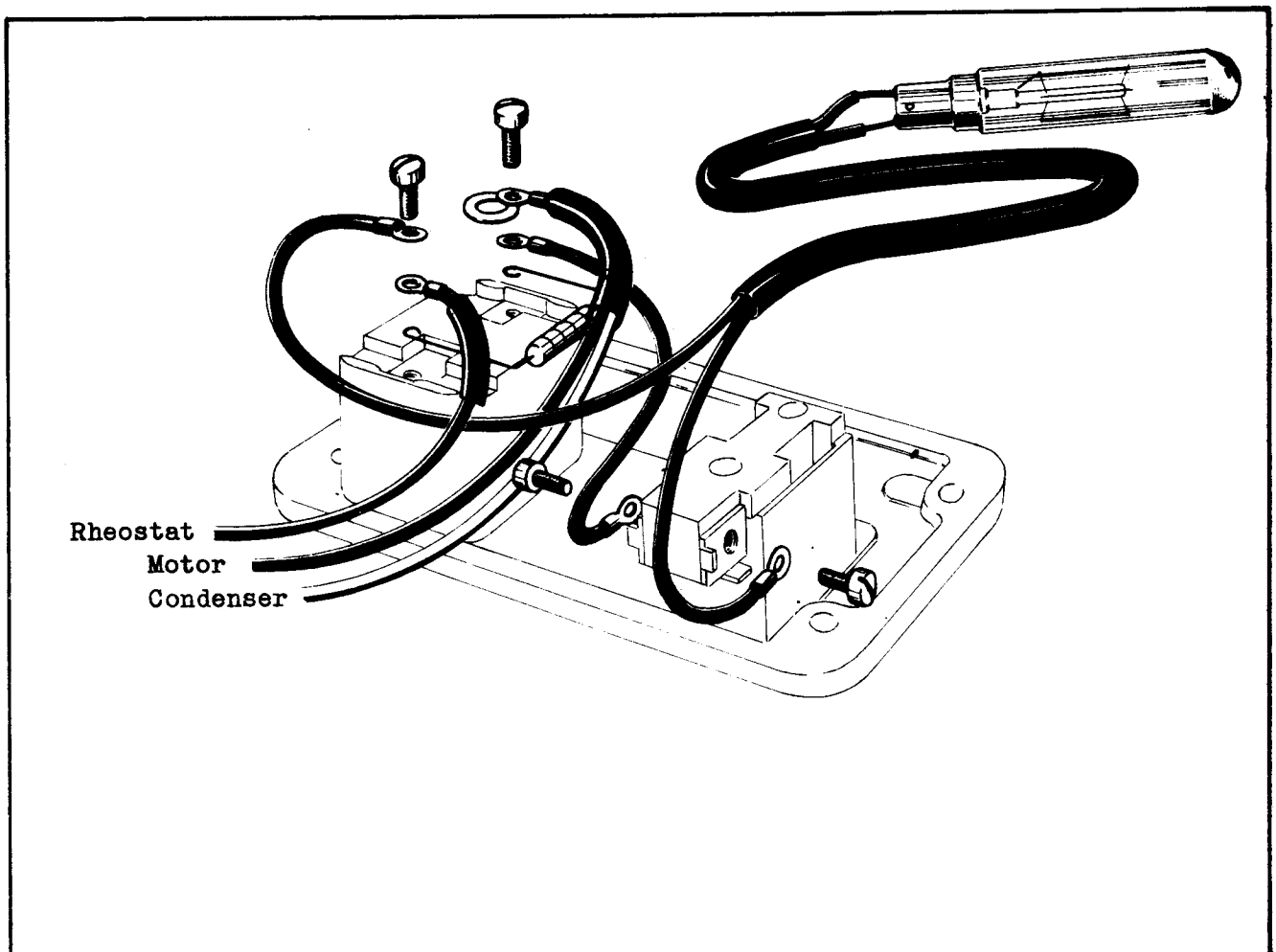
SWITCH PLATE - CONNECTIONS S-Z-T



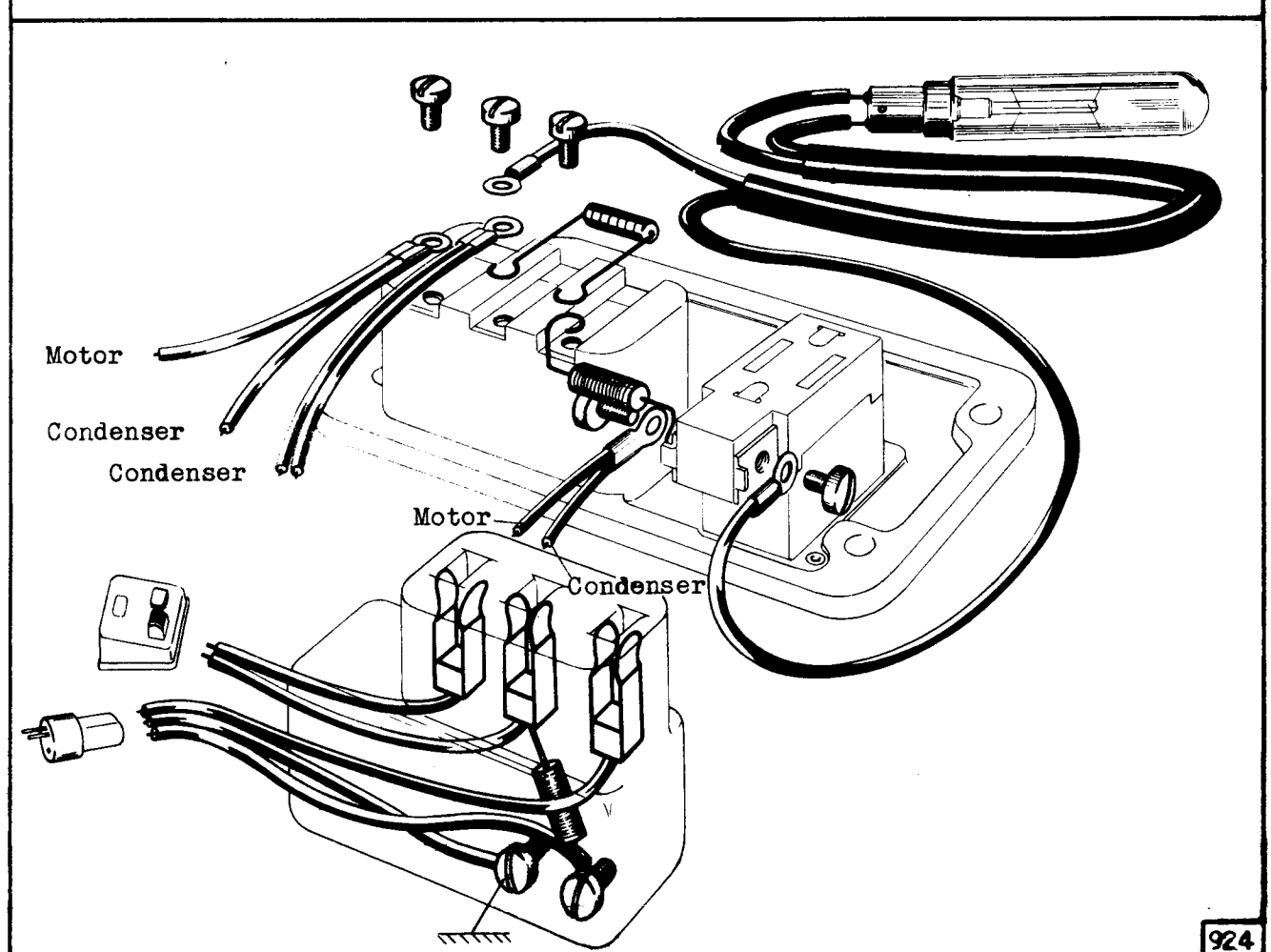


Printed in Switzerland
October 1959
Repairs

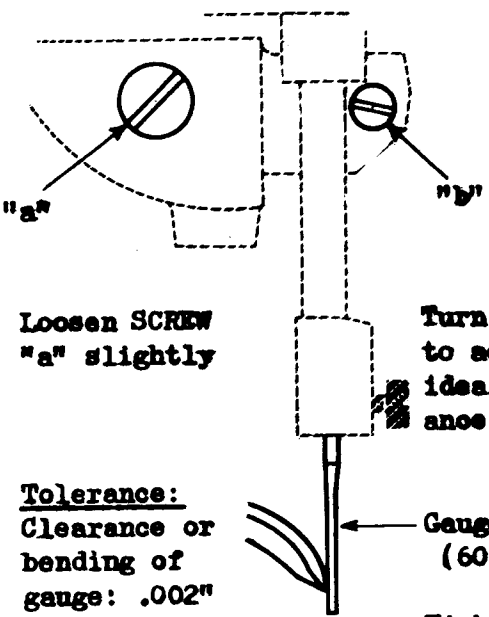
Printed in Switzerland



June 1960



NEEDLE CLEARANCE S-Z-T — 1



Loosen SCREW "a" slightly

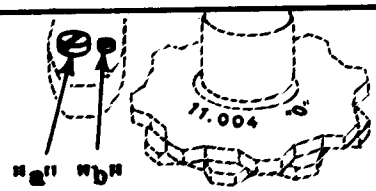
Turn at "b" to adjust ideal clearance

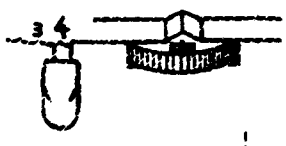
Tolerance:
Clearance or bending of gauge: .002"

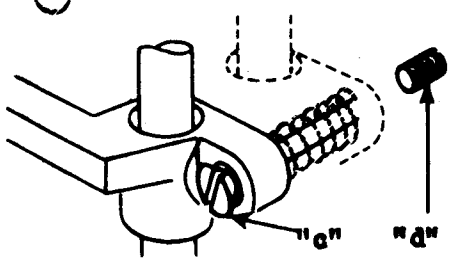
Gauge 11'001 (607'801)

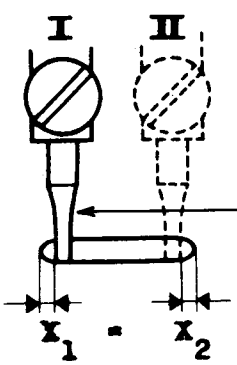
Tighten "a"

NEEDLE BAR SWING S-Z-EA — 2









Loosen SCREW "a" and adjust "b" to obtain the ideal swing :
$X_1 = X_2$

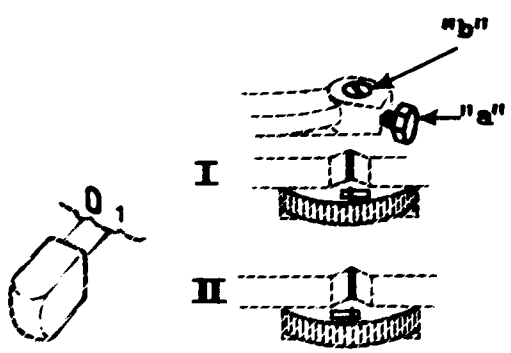
Tighten "a"

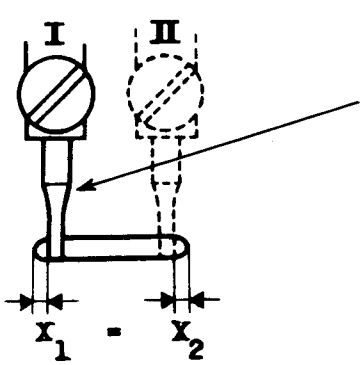
Gauge 11'001 (607'801)

Left swing: allow a very slight clearance for SCREW "c"

Tighten SCREW "d"

CENTERING S-Z — 3



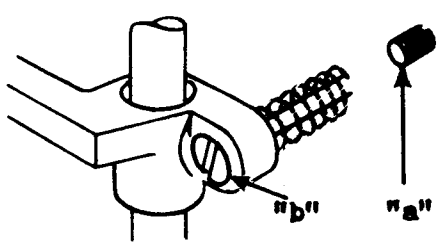


Gauge 11'001 (607'801)

Loosen SCREW "a" slightly and turn "b" to obtain ideal centering $X_1 = X_2$

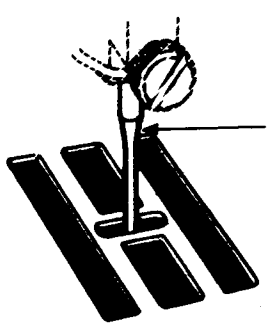
Tighten "a"

CENTERING T-EL — 4



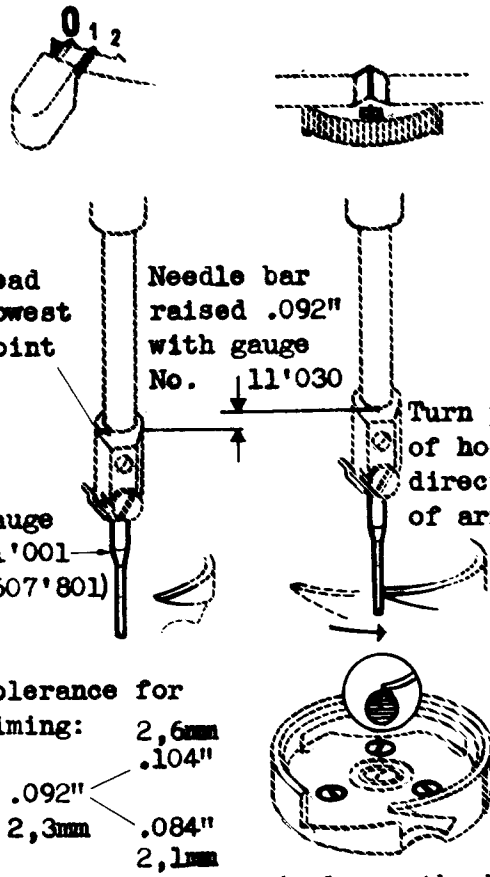
Loosen SCREW "a"
Turn at "b" to bring gauge to center

Tighten "a"



Gauge 11'001 (607'801)

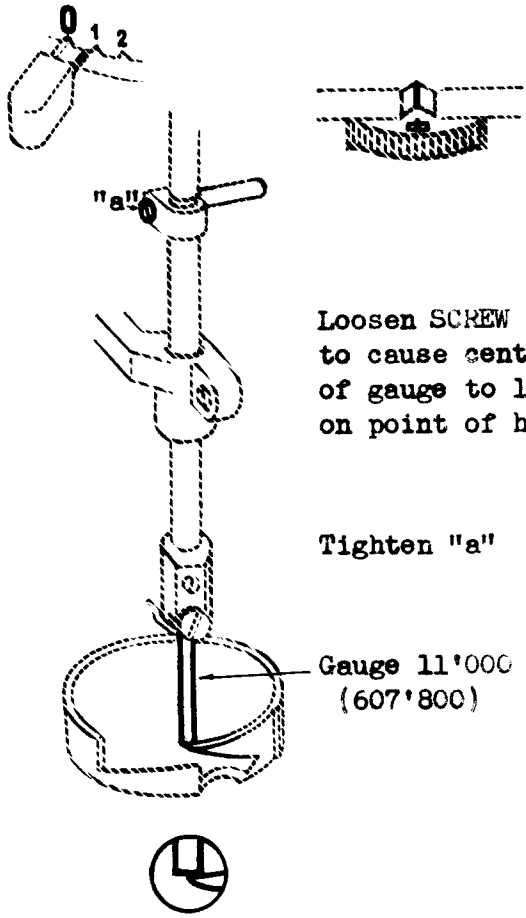
TIMING 5



Tolerance for Timing: 2,6mm .104" — .092" 2,3mm — .084" 2,1mm

Tighten three SCREWS progressively so the hook remains perfectly "flat"

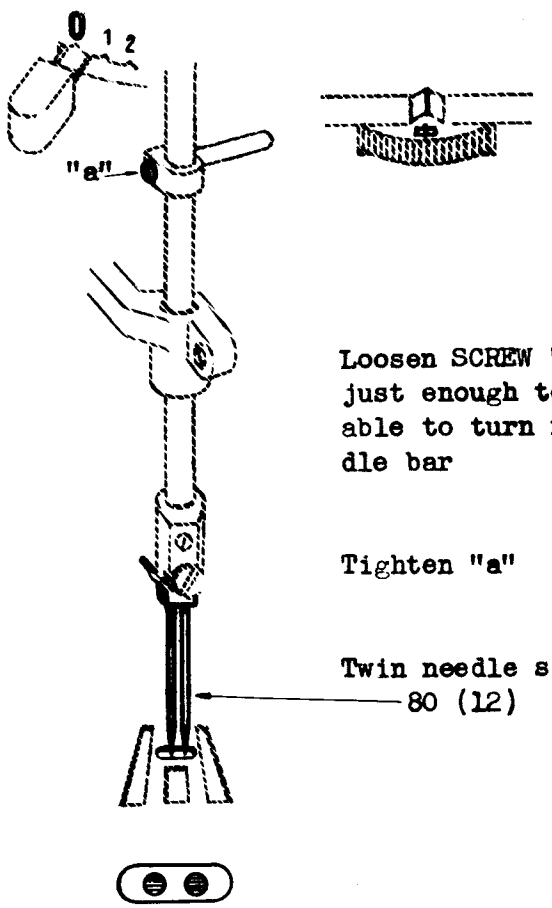
HEIGHT OF NEEDLE BAR 6



Loosen SCREW "a" to cause centre of gauge to lie on point of hook

Tighten "a"

ORIENTATION OF NEEDLE BAR 7

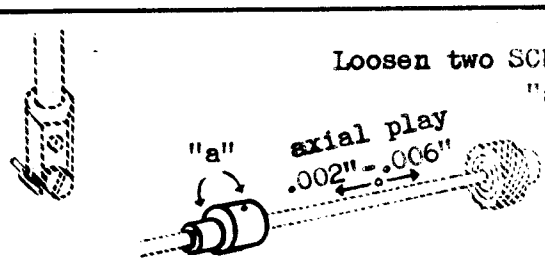


Loosen SCREW "a" just enough to be able to turn needle bar

Tighten "a"

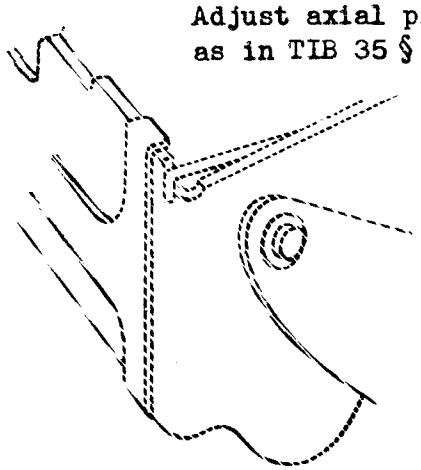
Twin needle size 80 (12)

RELEASE CAM S-Z-T 8



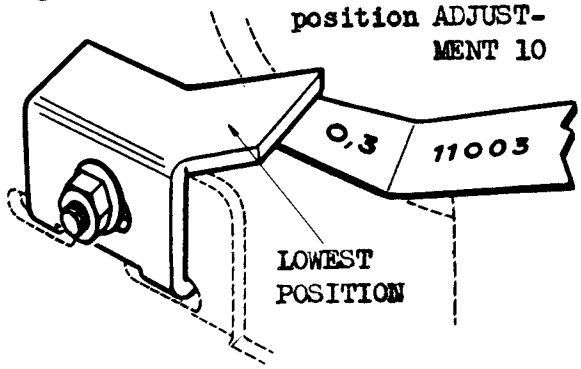
Place needle bar and thread release at LOWEST POSITION

Adjust axial play as in TIB 35 § 396



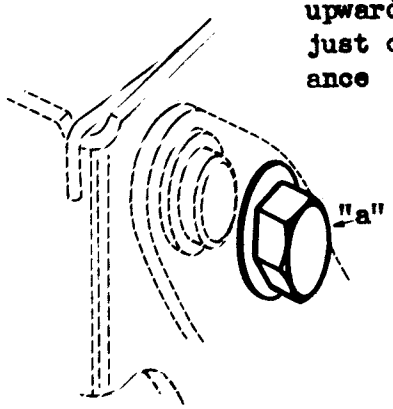
GUARD RING STOP S-Z-T 9

Set guard ring stop approximately in position ADJUSTMENT 10



Axial play thread release: Freely moving without play

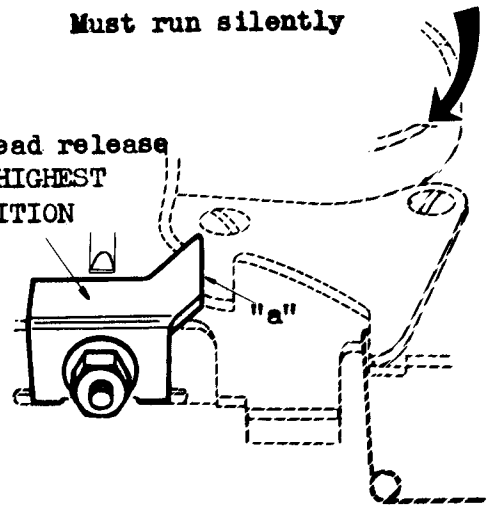
Turn "a" so that thread release moves upwards to adjust clearance



GUARD RING ESCAPEMENT S-Z-T 10

Press guard ring in direction of arrow and move STOP until it is aligned with beak "a"
Must run silently

Thread release in HIGHEST POSITION



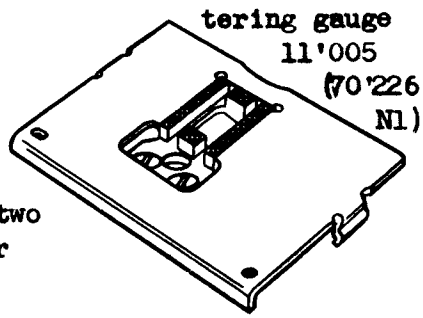
Tighten nut without forcing holding screw with screwdriver

SEE TIB 24 § 218

FEED DOG 11

Work cover 11'014

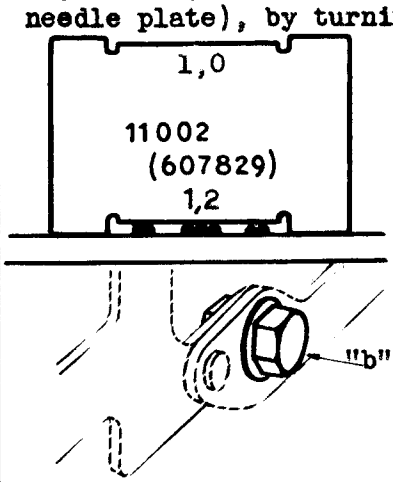
Feed dog centering gauge 11'005 (70'226 N1)



Fasten the two SCREWS after positioning

Support feed dog with screwdriver for tightening

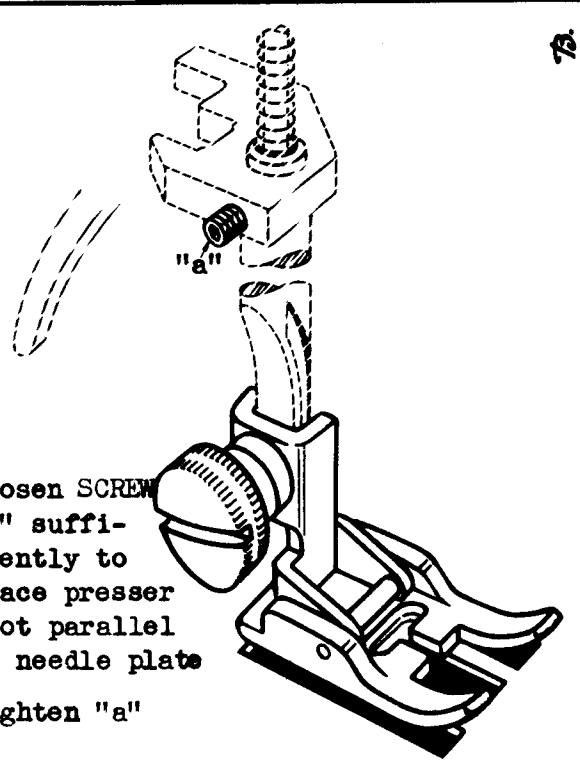
Adjust height at 1,2 (with needle plate), by turning



"b" so that feed dog moves upwards

Feed dog must not touch needle plate at 4 FWD and 4 REV

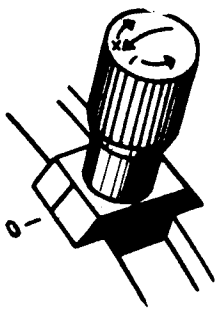
PRESSER BAR ORIENTATION 12



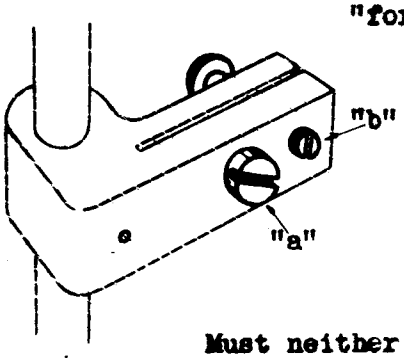
Loosen SCREW "a" sufficiently to place presser foot parallel to needle plate

Tighten "a"

STITCH LENGTH S — 13



shortens lengthens the "forward" stitch



Loosen "a", adjust "b"

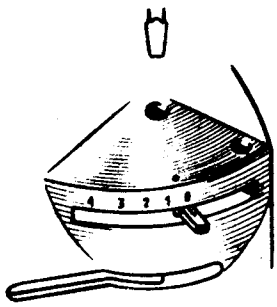
Must neither feed forward nor backward at "0"

SEE TIB 18 § 107

Tighten "a"

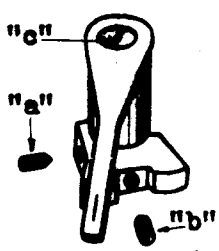
STITCH LENGTH Z-EL-EZ — 14

Work cover 11'027



Loosen "a", tighten "b"

Turn at "c" to obtain no forward nor backward feed at "0"

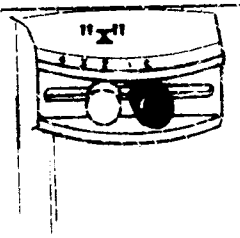


Tighten "b" and "a"

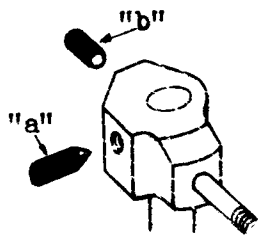
SEE TIB 417/5

Loosen "a", tighten "b"

Must neither feed forward nor backward at "x"



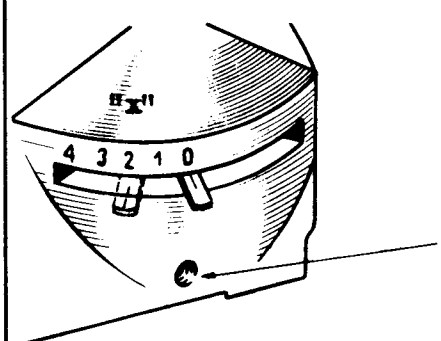
Loosen "b" to set lever at "0"



After obtaining adjustment at "0", tighten "b" and "a" and check

SEE TIB 463 § 8

STITCH LENGTH T — 15



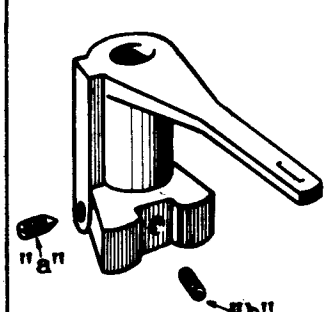
Remove cover to loosen "a"

Replace cover without STOP SCREW

No forward or backward feed at "x"

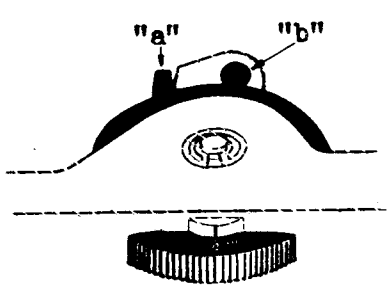
Loosen "b" to set lever at "0"

Tighten "b"



After obtaining adjustment at "0", tighten "b" and "a" firmly and check

STITCH LENGTH EA — 16



Must neither feed forward nor backward at "0"

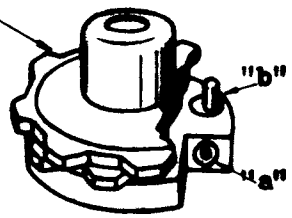
Loosen "a", adjust "b"

Tighten "a"

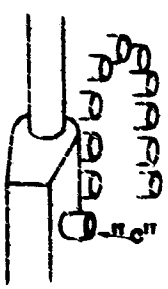
SEE TIB 515 B/1

ELNA-DISC DRIVE S-Z-EA 17

11'004
(607'836)

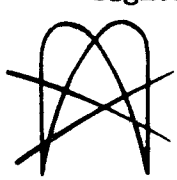


Run machine at full speed, observe reflection of light on stud "c"



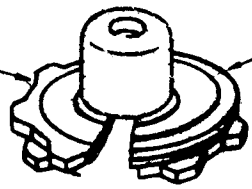
Loosen "a", adjust "b"

Tighten "a"



AUTOMATIC CLOTH FEED S 18

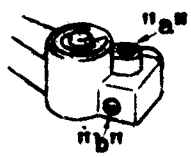
11'004
(607'836)
up to
machine
1'104'935



11'029
as from
machine
1'104'936

Loosen "a", adjust "b" to have neither forward nor backward feed at ⊖

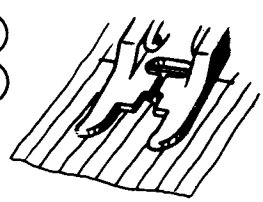
Tighten "a"



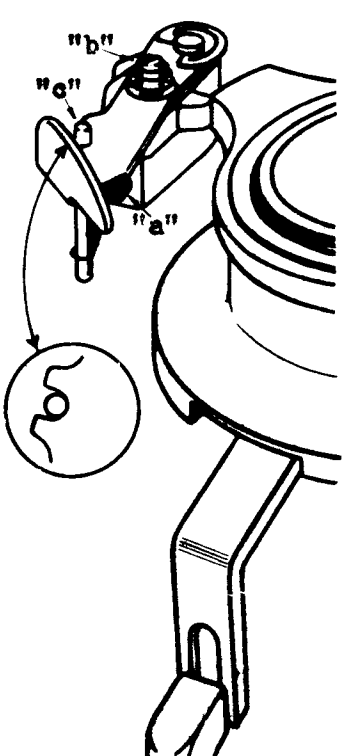
Must advance at ⊕

Must move back at ⊖

Advance and return practically equal



BUTTONHOLE DISC S 19



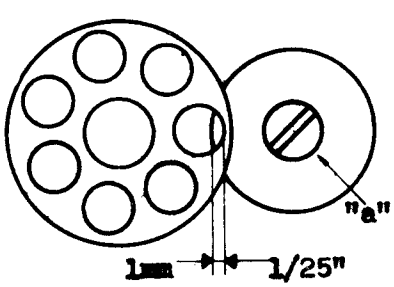
Loosen "a" adjust "b" until key lever presses from the right on pin "c"

Tighten "a"

SKE TIB 33
§ 1-2

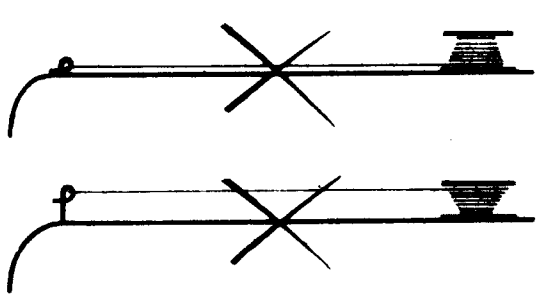
BOBBIN WINDING S-Z-T 20

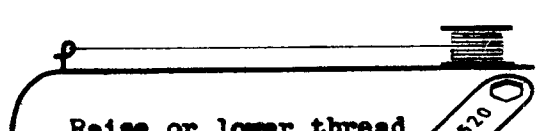
FLYWHEEL UNCOUPLED



Loosen "a" so stop edge is about 1/25" inside one bobbin hole

Tighten "a"

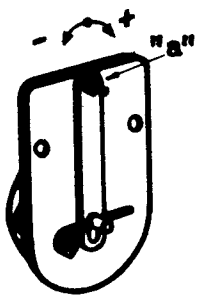


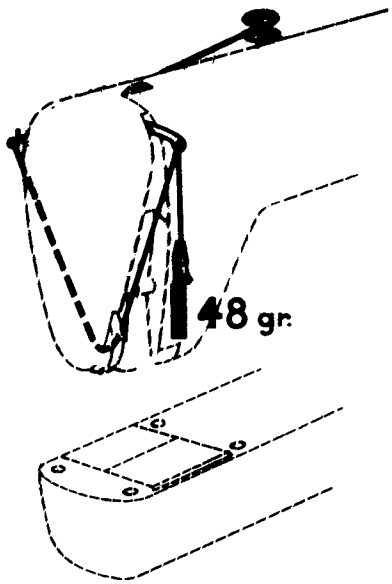


Raise or lower thread guide until ideal winding is achieved
OLD TYPE WINDER:
Use wrench 11'520

UPPER TENSION S-Z-T 21

Darning thread
UFAG 70 (120)
or equivalent





¾ : falls slowly

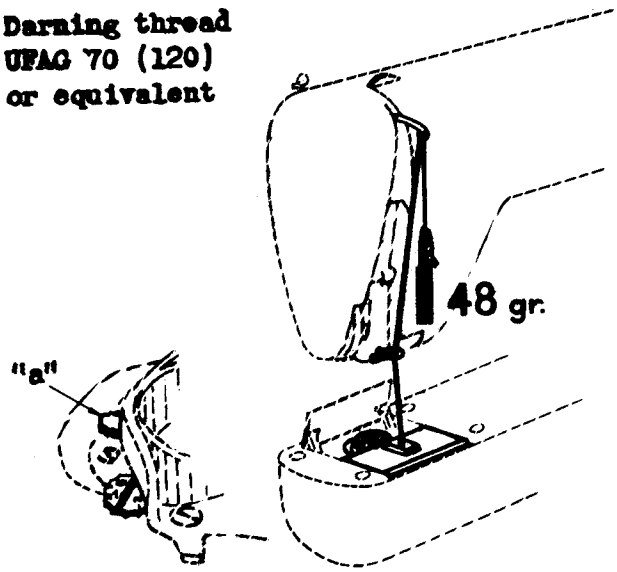
1¼ : stops

Turn nut "a" to adjust

SEE TIB 25 § 228 a C/3

LOWER TENSION S-Z-T 22

Darning thread
UFAG 70 (120)
or equivalent



¾ : falls slowly

1 : stops

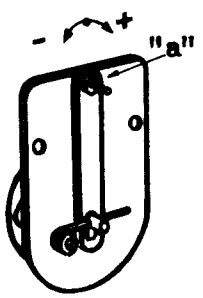
Loosen guard ring beak to be able to turn lower tension axle "a"

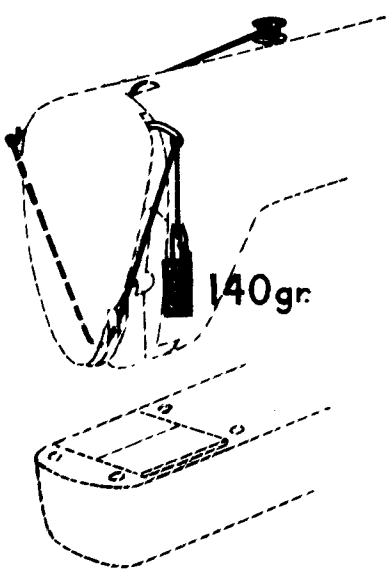
After adjustment, tighten guard ring beak screws

SEE TIB 25 § 228 b C/3

UPPER UNIVERSAL TENSION 23

Darning thread
UFAG 70 (120)
or equivalent





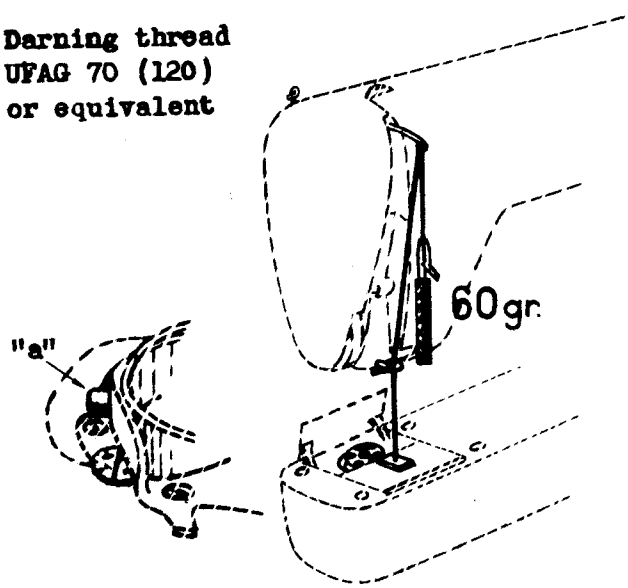
S-Z-T		EL-EZ-EA	
3½	: falls slowly	4½	: falls slowly
4	: stops	5	: stops

Turn nut "a" to adjust

SEE TIB 418/2a C/3 515/b A/2

LOWER UNIVERSAL TENSION 24

Darning thread
UFAG 70 (120)
or equivalent



S-Z-T		EL-EZ-EA	
¾	: falls slowly	1¼	: falls slowly
1	: stops	1½	: stops

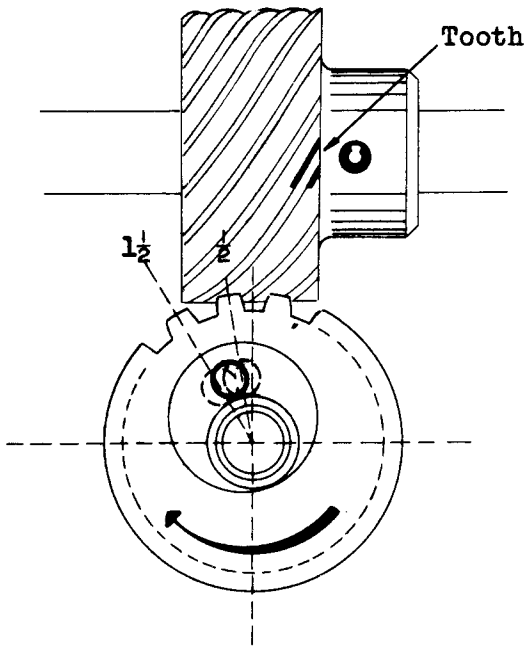
Loosen guard ring beak to be able to turn lower tension axle "a"

After adjustment, tighten guard ring beak screws

SEE TIB 418/2b C/3 515/b A/2

FEED GEAR S-T — 25

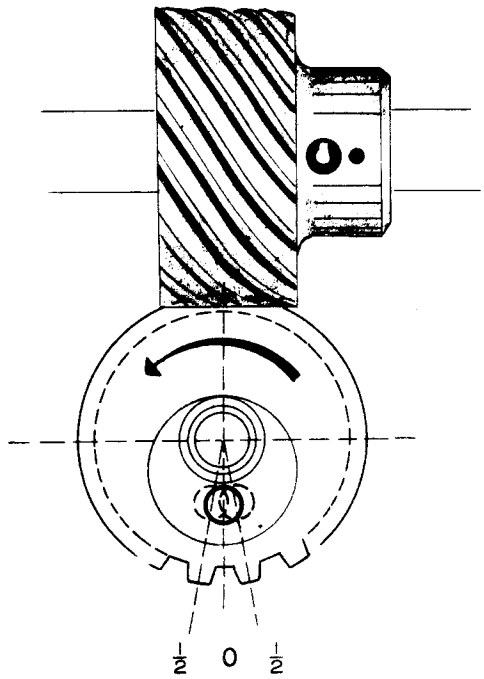
up to 866'040



SEE TIB 18 § 103

FEED GEAR S-Z-T — 26

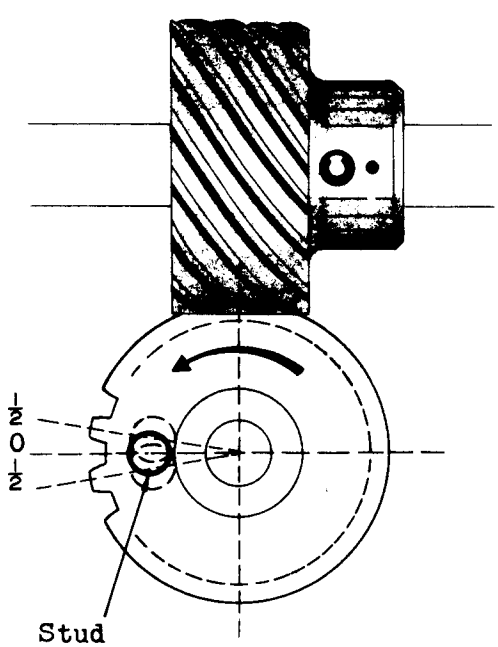
as from 866'041



SEE TIB 35 § 395

FEED GEAR S-EL-EZ-EA — 27

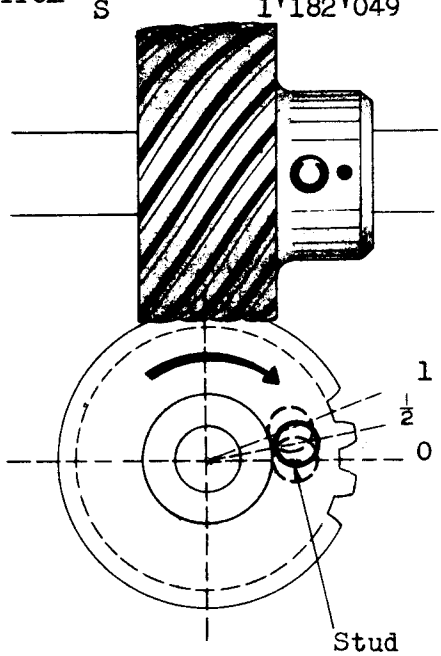
as from 1'104'936



SEE TIB § 463/4 A/2

FEED GEAR S-EL-EZ-EA — 28

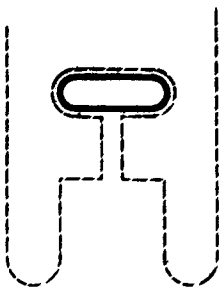
as from EL-EZ-EA 1'170'040
S 1'182'049



SEE TIB § 545 B/4
§ 565 B/4

NEEDLE CLEARANCE EL-EZ-EA 29

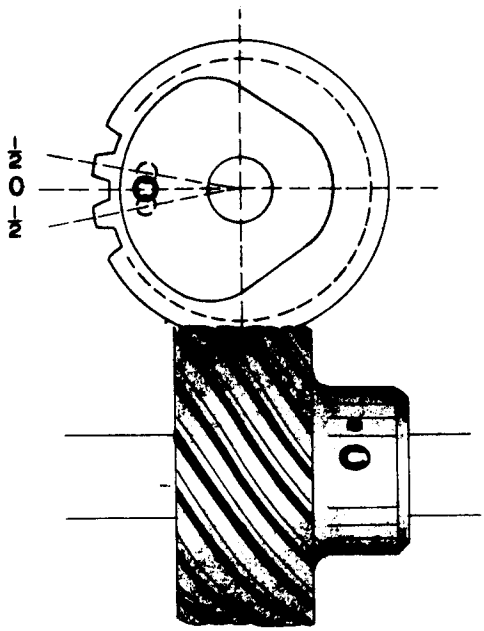
Slightly loosen CASING CONNECTING SCREWS to align slot in foot with needle plate hole by moving casings



Gauge 11'001 (607'801)

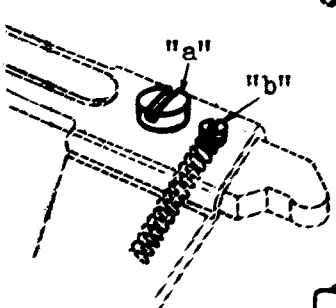
Adjust clearance as per ADJUSTMENT 1 and tighten the 4 CASING CONNECTING SCREWS

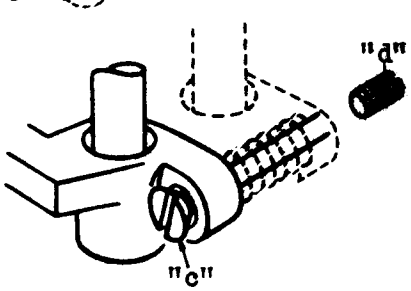
CAM GEAR EZ 30

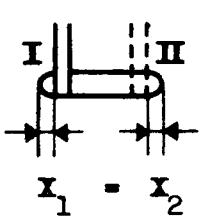


SEE TIB § 463 p.8/1 A/2

NEEDLE BAR SWING EZ 31







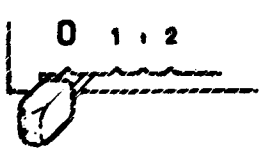
Loosen SCREW "a", turn "b" to obtain ideal swing : $X_1 = X_2$

Tighten "a"

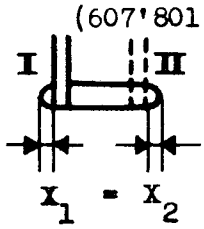
LEFT SWING: leave a slight clearance for SCREW "c"

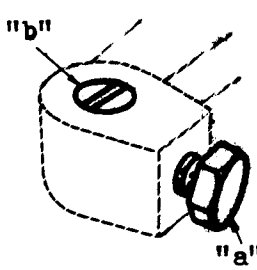
Tighten "d"

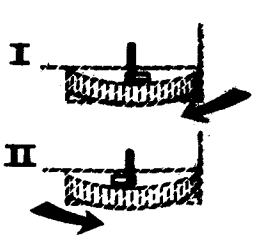
CENTERING EZ-EA 32



Gauge 11'001 (607'801)

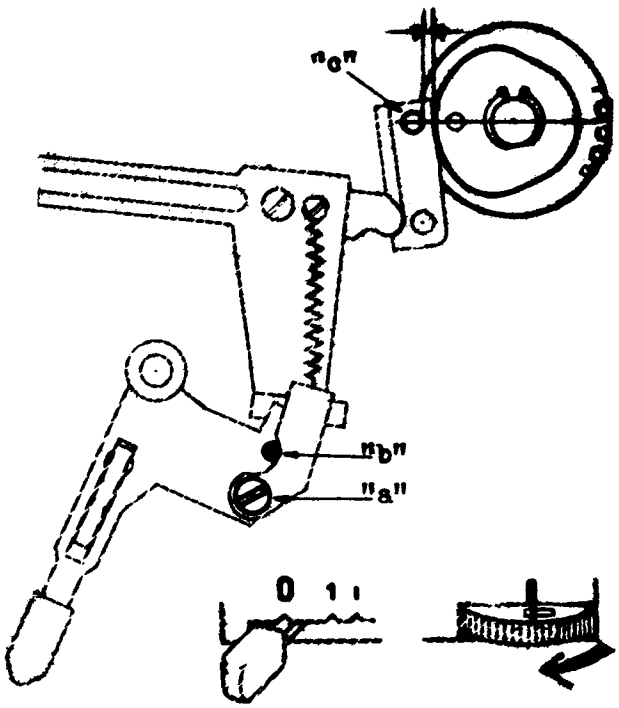






Slightly loosen SCREW "a" and turn "b" to obtain ideal centering: $X_1 = X_2$

Tighten "a"



Loosen SCREW "a", turn "b" to adjust a slight play between "c" and CAM GEAR

Tighten "a"

ELNA

E 3

MECHANICAL HANDBOOK

ELNA JUNIOR

TAVARO S.A.

GENEVA

AUGUST 1960

PRINTED IN SWITZERLAND

Assembly Sequence	Description of parts	Remarks
	A. Preassembly of the Front Casing	The parts to be lubricated with Caltex Multifak grease no. 2 are marked on the drawing with an asterisk
1	Front casing	
2	Music box	
3	Music knob brake	Before tightening the screws "4", check whether the winding key "5" and the music knob "6" are centered opposite the holes in the front casing "1"
4	2 Cylindrical screws	
5	Winding key	
6	Music knob	
7	Flywheel	Insert these parts together in the casing
8	Driving belt	
9	Washer 6	
10	Truarc locking ring 6 ...	To be pushed against "7" until axial play is eliminated
11	Needle bar crank	
12	Threaded pin	
13	Thread take-up lever	Insert "13" and "14" separately into casing and then connect them, using "15" and "16"
14	Needle bar	
15	Phillips screw M4	
16	Nut M4	
17	Needle clamp	To be fastened on needle bar "14"
18	Needle clamp screw	
19	Tension disc	Assemble the tension device on the pin
20	Tension spring	
21	Tension knob	
22	Lower shaft	Setting the Timing : Place "22" in the casing from the free arm side and at the same time insert "23" and "24". Bring "14" to its dead lowest point (must be retained in exactly the same position) and place "8" over "24", the slot of which must be displaced by ½ tooth to the right of the top vertical position (fig. 1). Fasten "25" and "26" provisionally with screws "27" and "28" (fig. 2; the final adjustment of the timing will be done later) and insert 29.
23	Self-locking brake	
24	Driving pinion	
25	Feed cam	
26	Hook	
27	Threaded pin M3	
28	Pointed set screw M3	
29	Pin 1,5 × 12	
30	Belt retaining spring 6	
31	Truarc locking ring 6	
32	Washer	
33	Handle	
34	Truarc locking ring 4 ...	Push "34" on axle, until axial play disappears.
	B. Preassembly of the Rear Casing	
35	Rear casing	Insert "36" in the lower bearing of the casing, place "37" on "36" and insert "36" into the upper bearing of the casing. Attach "38" by means of "39" on "36", pressing it in from the left (fig. 3). Fasten "37" with "40" and make sure that the end of "37" comes to lie in the groove in "40" (fig. 4)
36	Cloth presser bar	
37	Presser spring	
38	Presser foot lever	
39	Foot lever pin	
40	Presser bar guide	

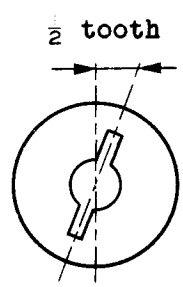


Fig. 1

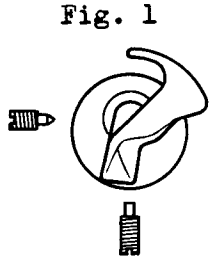


Fig. 2

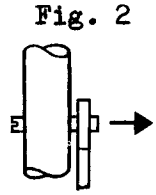


Fig. 3

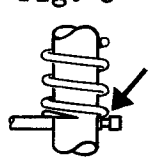


Fig. 4

Assembly Sequence	Description of parts	Remarks
41	Stitch length knob axle	Place "42", "43" and "44" in turn on "41" and screw this subassembly fast in the casing
42	Stitch length knob	
43	Feed dog	
44	Washer 4	
45	Threaded pin M3	Screw "45" tight in the casing. Place "46" on "45" so that its long end comes to lie against the casing and the short end against "42" (fig. 5), then bend the long end back behind the extension of the feed dog "43"
46	Feed dog spring	
	C. Assembly of the Casings, Adjustments	
47	Screw M4	When assembling the casings "1" and "35", care must be taken that the fork of the feed dog "43" fits into cam "25". The whole unit is then fastened together with the screws "47", "48", "49" and "51" and the spool pin "50" is fastened with screw "51"
48	Screw M4	
49	Screw M4	
50	Spool pin	
51	Screw M4	
52	Spool pin felt	

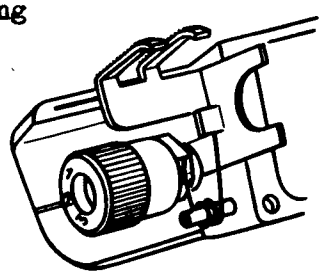


Fig. 5

It is now possible to proceed with the final adjustment of the timing and the needle clearance as follows :

a. Place a straight needle no. 80 in the needle clamp "17".

b. Loosen the screws "27" and "28".

c. Place the point of the hook behind the needle.

d. Turn the flywheel, until the point of the hook is only 1,5 mm above the eye of the needle (approximately 1,5 × height of eye).

e. Displace the hook "26" inside of the lower shaft until its point grazes the needle.

f. Tighten the hook "26" by means of the screw "27".

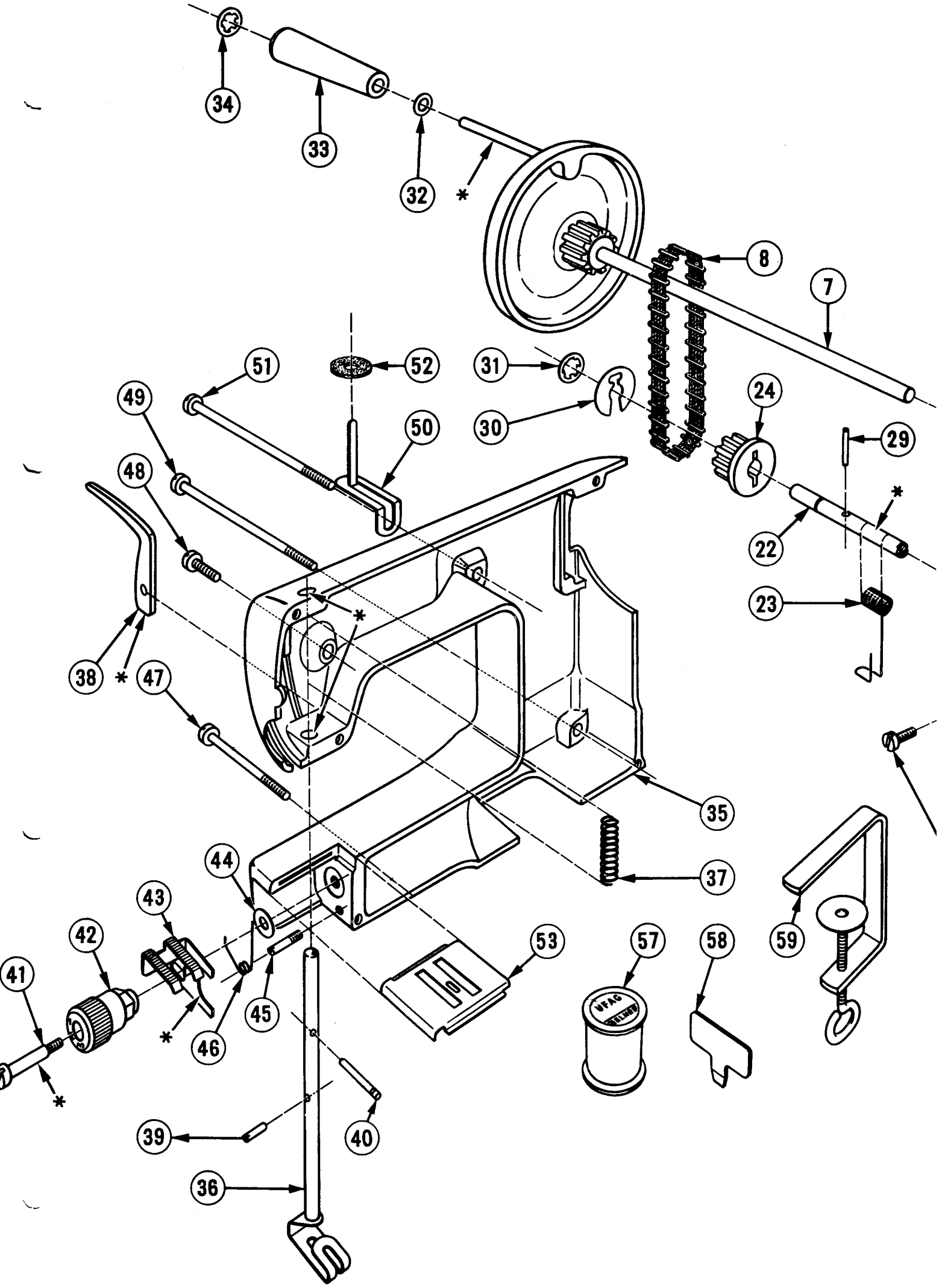
g. Check the timing and needle clearance.

h. After completing the assembly, tighten the screws "27" and "28" well and secure them by striking them on the rim with a punch.

i. Loosen the screw M4 "47", in order to be able to separate the two casings at the end of the free arm.

53	Needle plate	Separate the two casings slightly, insert "53" and center, so that the needle passes through the center of the slot. Fasten "54" and "55". When screwing on "55", make sure that the screw "56" at the same time holds the self-locking brake "23".
54	Rubber foot	
55	Base	
56	Screw M4	

For dismantling, simply proceed in the reverse order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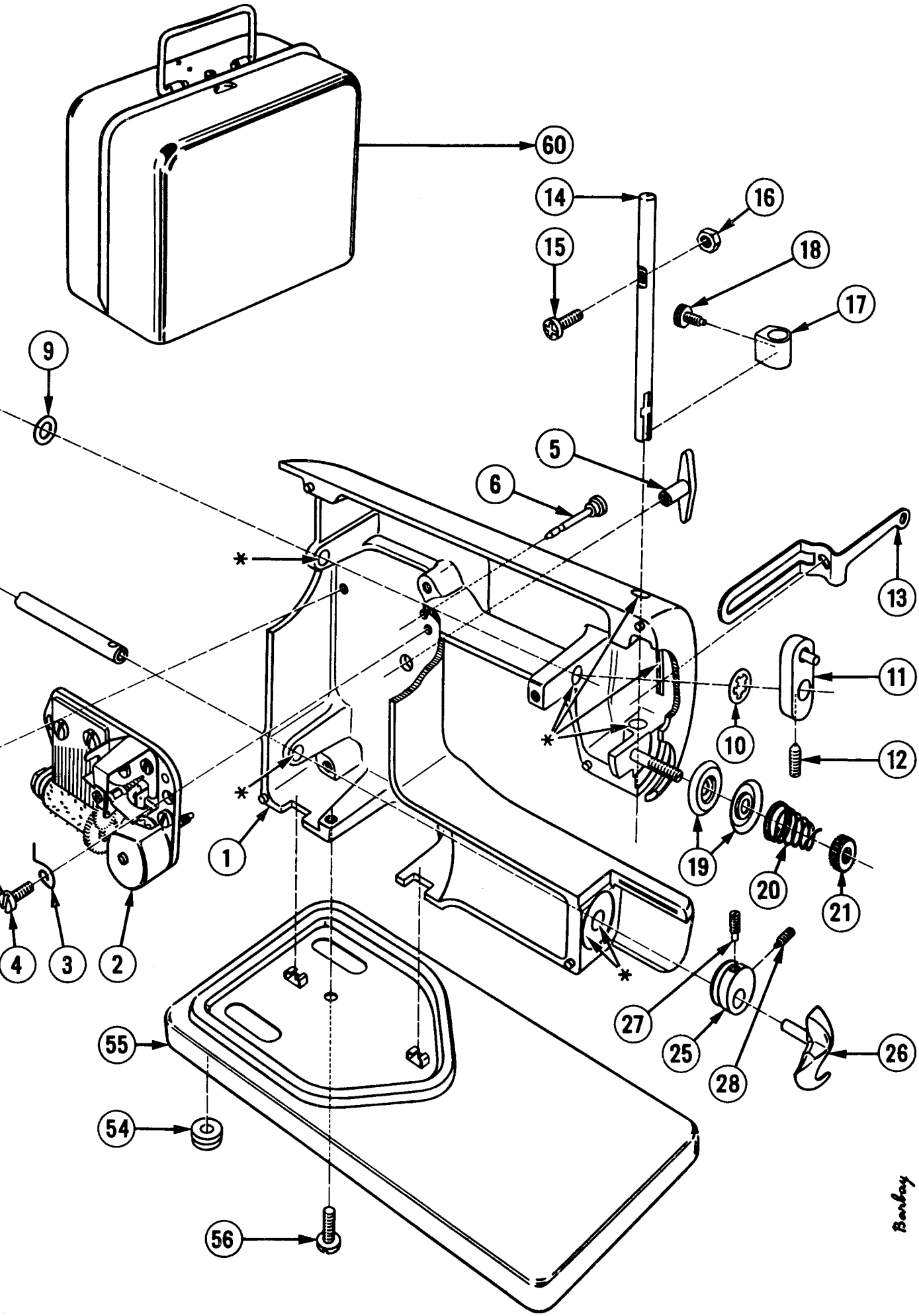
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Barbay

HOW TO ATTEND TO DISORDERS

Disorders on the ELNA Junior are mainly due to the machine having been taken apart by the customer, by it having been dropped or by individual parts having been lost.

A. Machine Dismantled by Customer

Depending upon the extent to which it has been taken apart, the machine may be more or less dismantled and reassembled correctly. For this, use the drawings and the above explanations as a guide.

B. Possible Repairs to a Machine that Has Been Dropped

a. Tension Pin, Thread Guide
If these parts should no longer be firmly lodged in the casing, they may be tightened with one or two blows with a punch. For the tension pin, this is to be done on the upper part of the thicker wall, above the pin, and for the thread guide on the wall thickness around it, on the inside of the rear casing.

b. Thread Take-Up Lever
If this part is bent or broken, it must be replaced.

c. Flywheel Handle
If this part is bent, it can be straightened with a pair of pliers, but by using a piece of material as a pad, in order not to damage it. If the handle axle is broken off, the whole upper shaft must be replaced.

d. Presser Foot Lever
If it is bent, first try to straighten it. Otherwise it must be replaced.

C. Sewing

If the sewing is faulty, first make sure that the machine is properly threaded.

a. Failure to Form Stitches
Check the needle and, if necessary, replace it. Check the timing and clearance.

b. Skips Stitches
Check the needle and, if necessary, replace it. Check the timing and needle clearance.

c. The Thread Breaks
Check the needle and, if necessary, replace it. Check the tension device as well as the timing and needle clearance.

d. Tension is Too Weak
Verify, whether the tension device has been properly assembled.

e. Material Is Fed Unevenly
If the stitch length is irregular, verify whether the feed dog has been properly fitted (jamming). If the material is not fed in a straight line, check to see whether the presser foot presses properly on the feed dog.

D. Music Box

If the winding key or the music knob touch the casing, loosen the fixation screws of the music box and center the winding key and music knob in their respective holes by displacing the music box inside the casing. Retighten the fixation screws and reassemble the machine.

List of Available Parts

Guide Number	Description	Drawing Number	Guide Number	Description	Drawing Number
3	Music knob brake	380'520	32	Washer	714'112
4	Screw M3	714'200	33	Handle	380'290
5	Winding key	380'900	34	Truarc locking ring 4	380'640
6	Music knob	380'510	36	Cloth presser bar	390'480
7	Flywheel	390'051	37	Presser spring	380'450
8	Driving belt	380'030	38	Presser foot lever	380'220
9	Washer 6	714'109	39	Foot lever pin	380'340
10	Truarc locking ring 6	380'650	40	Presser bar guide	380'470
11	Needle bar crank	390'150	41	Stitch length knob axle	380'130
12	Threaded pin	380'430	42	Stitch length knob	380'110
13	Thread take-up lever	380'141	43	Feed dog	380'080
14	Needle bar	380'171	44	Washer 4	380'350
15	Phillips screw M4	714'026	45	Threaded pin M3	380'590
16	Nut M4	714'050	46	Feed dog spring	380'120
17	Needle clamp	380'180	47	Screw M4	380'240
18	Needle clamp screw	711'089	48	Screw M4	380'250
19	Tension disc	380'190	49	Screw M4	380'230
20	Tension spring	380'200	50	Spool pin	380'320
21	Tension knob	380'210	51	Screw M4	380'230
22	Lower shaft	380'301	52	Spool pin felt	380'420
23	Self-locking brake	380'610	53	Needle plate	380'270
24	Driving pinion	380'310	54	Rubber foot	715'261
25	Feed cam	380'101	55	Base	380'040
26	Hook	380'091	56	Screw M4	380'250
27	Threaded pin M3	380'501	57	Spool of thread	390'580
28	Pointed set screw M3	380'630	58	Screwdriver	380'570
29	Pin 1,5 × 12	380'360	59	Fixation clamp	390'370
30	Belt retaining spring 6	380'620	60	Carrying case	390'700
31	Truarc locking ring 6	380'650			
2	Music box (only available in limited quantities for replacement of defective music boxes)	390'901			

List of Parts Not Supplied

1	Front casing	35	Rear casing

ELNA

E 3

MECHANICAL HANDBOOK

ELNA INDUSTRIAL

TAVARO S.A.

October 1961

GENEVA

PRINTED IN SWITZERLAND

CONTENTS

Printed in Switzerland
October 1961
ELNA Industrial

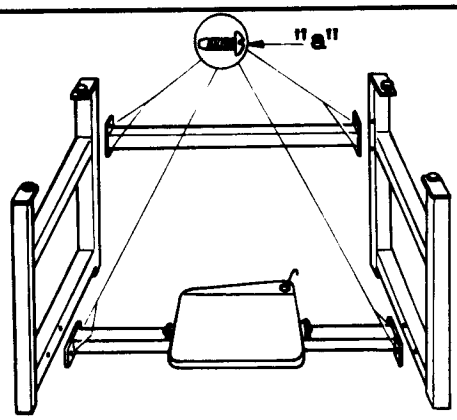
ASSEMBLY OF WORK TABLE

Printed in Switzerland

December 1960

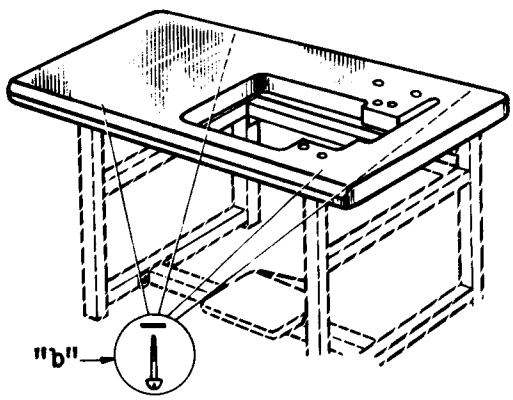
Table Industrial

1



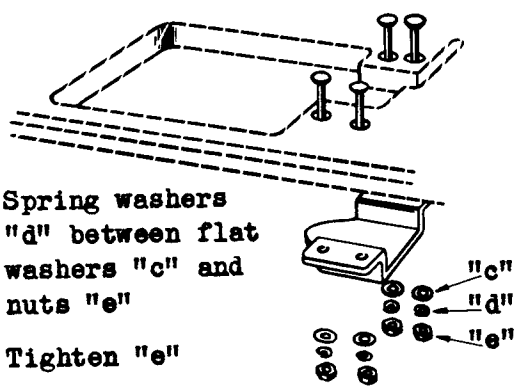
Tighten SCREWS "a" after having checked that table rests evenly on its 4 feet

2



Pierce silentblocks with screw "b" in order to fix table plate

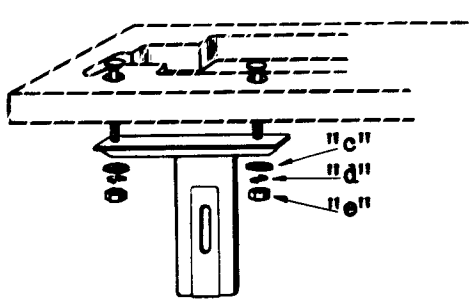
3



Spring washers "d" between flat washers "c" and nuts "e"

Tighten "e"

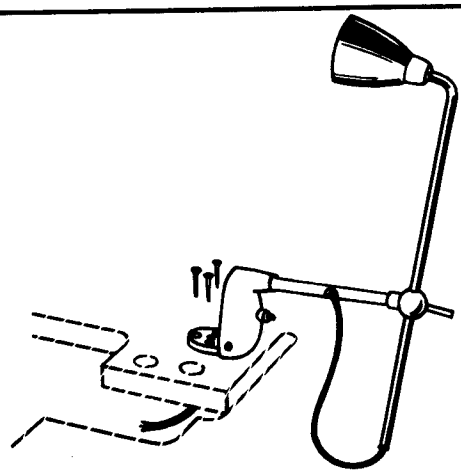
4



Spring washers "d" between flat washers "c" and nuts "e"

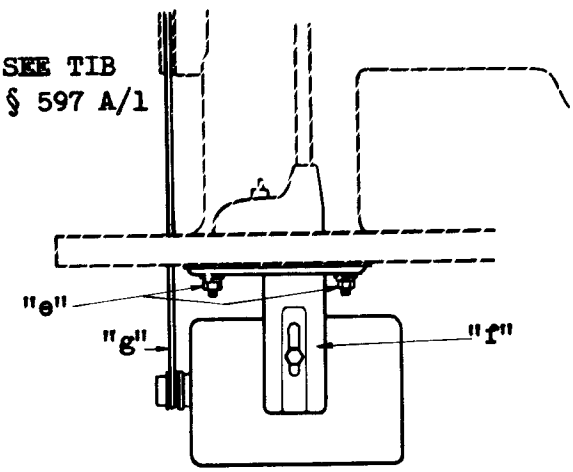
Do not tighten "e"

5



6

SEE TIB § 597 A/1



Slide motor support "f" laterally so that driving belt "g" is in correct position

Tighten "e"

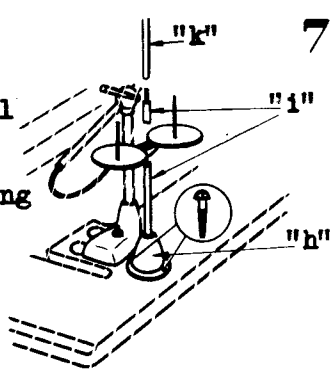
7

Fix "h"

Fit "i" with spool support in place

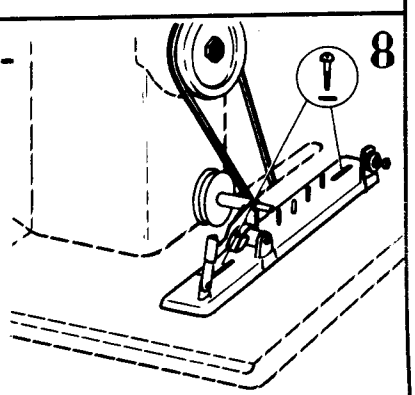
Press "k" on spring pin of "i"

Fasten support at desired height



8

Fasten the bobbin winder so that it does not touch the driving belt when disengaged and so that it is driven correctly when engaged

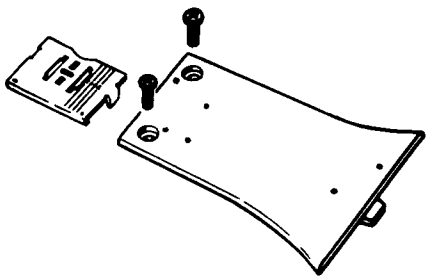


1001

REPLACEMENT OF ROTARY HOOK PINION

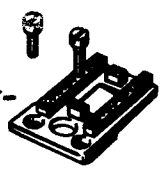
DISMANTLING

1

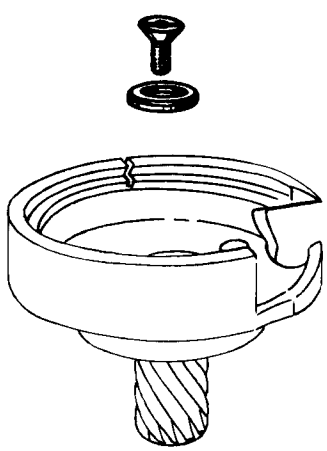


2

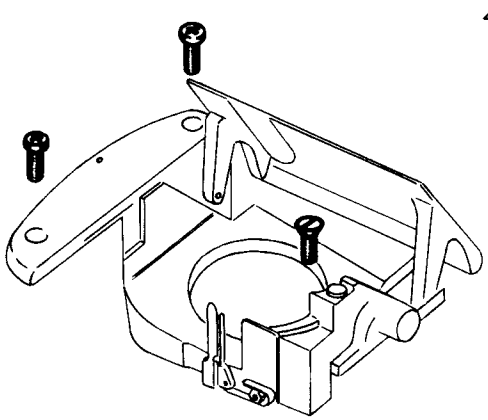
Support FEED DOG with screwdriver to unscrew



3



4



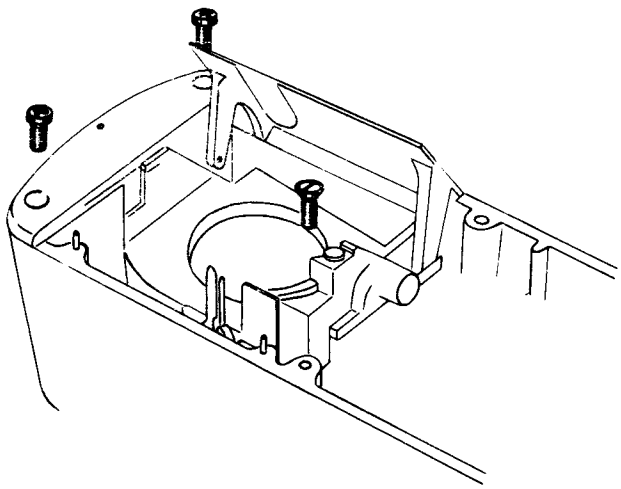
5

To facilitate assembly, first note position of hook pinion. Timing position will thus be more easily located.

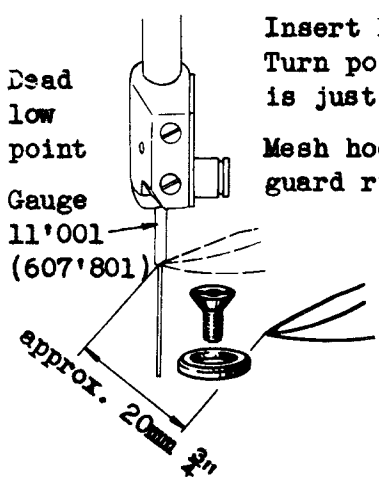
ASSEMBLY

1

2



3



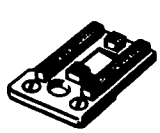
Insert hook
Turn point so that it is just behind gauge

Mesh hook and lodge guard ring beak

Refit washer(s) and screw

TIMING : ADJUSTMENT 4

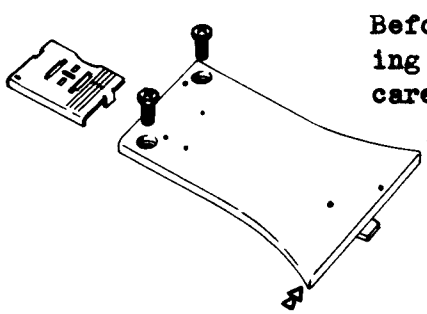
4



Support FEED DOG with large screwdriver to tighten screws

ADJUSTMENT 9

5



Before fastening cover, take care that it fits upper casing

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Oktober 1961
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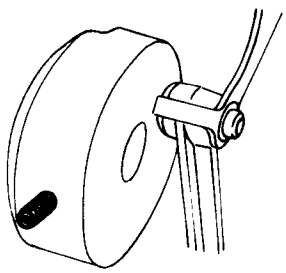
REPLACEMENT OF DRIVING BELT

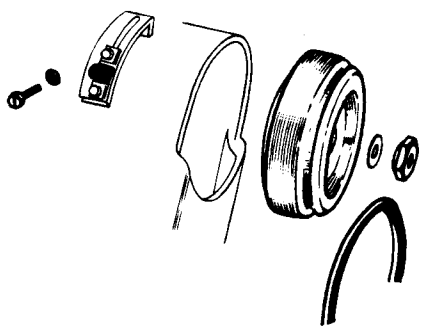
DISMANTLING

1

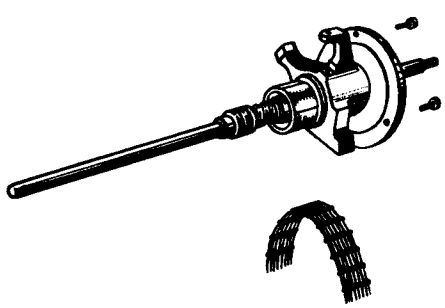


Loosen COUNTER-WEIGHT SCREW

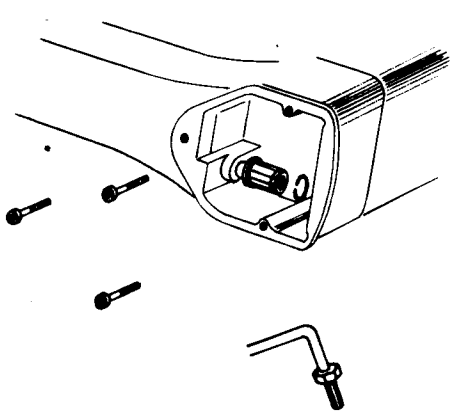
2



3

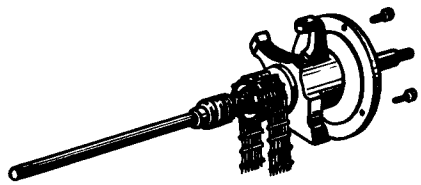


4

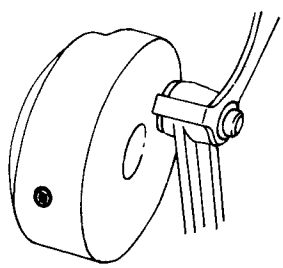


ASSEMBLY

1



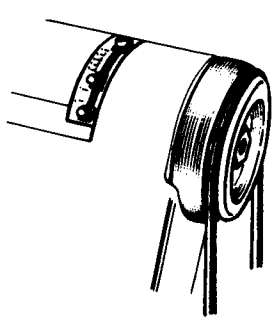
2



The tip of the COUNTERWEIGHT SCREW should be lodged in the hole in the upper shaft

Tighten

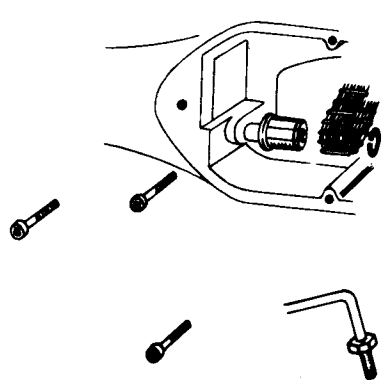
3



Fix :
STITCH LENGTH SCALE
FLYWHEEL

4

NEEDLE BAR down
FEED GEAR SEE under ADJUSTMENT 8
TIMING OF HOOK : ADJUSTMENT 4
CONTROL : ADJUSTMENT 13



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December 1960
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REPLACEMENT OF CHECK SPRING
UPPER TENSION

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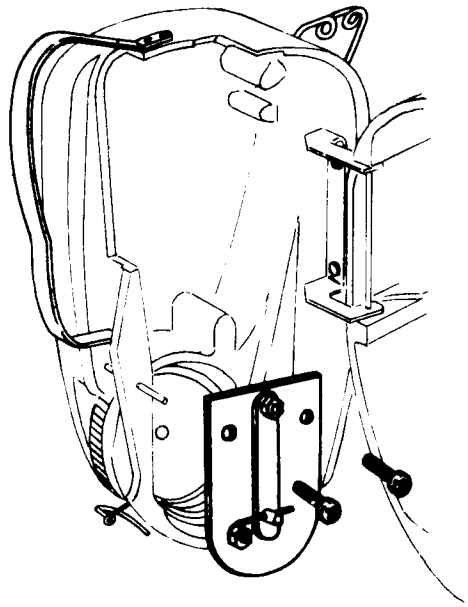
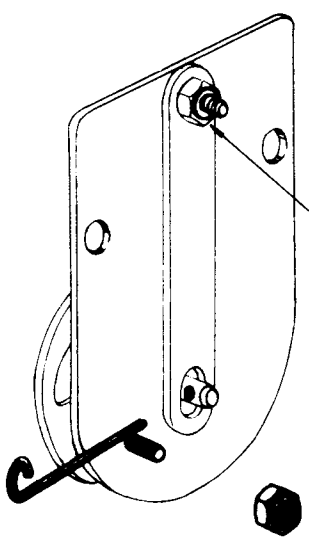
December 1960
Repairs Industrial

DISMANTLING

1

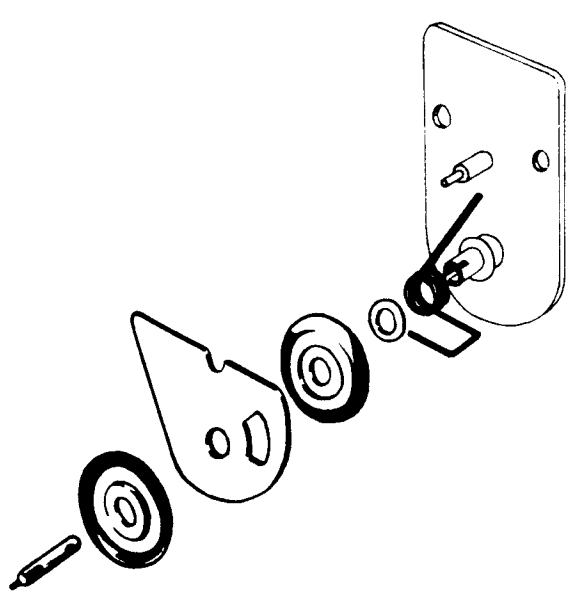


2



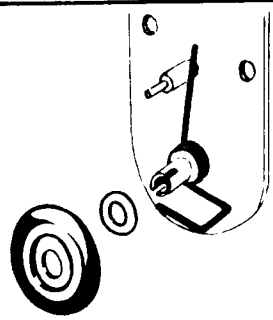
Avoid touching upper NUT which adjusts tension

3

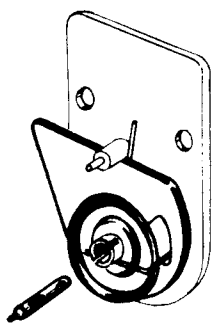


ASSEMBLY

1



2



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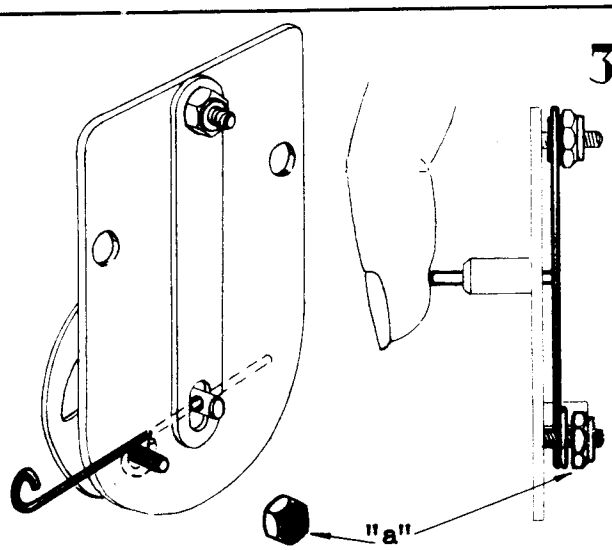
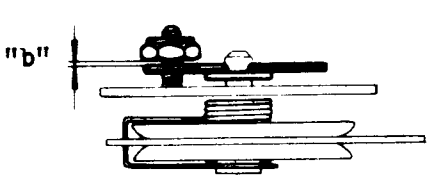


"SEEN FROM A"

Tighten NUT "a" to obtain MINIMUM PLAY "b"



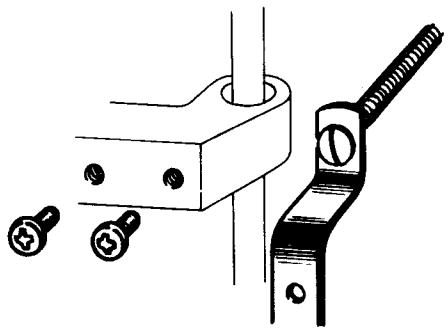
CHECK : ADJUSTMENT 15

CHANGING OF THE ASSEMBLY

COUNTERWEIGHT - THREAD TAKE-UP LEVER - NEEDLE BAR CONNECTING ROD

DISMANTLING

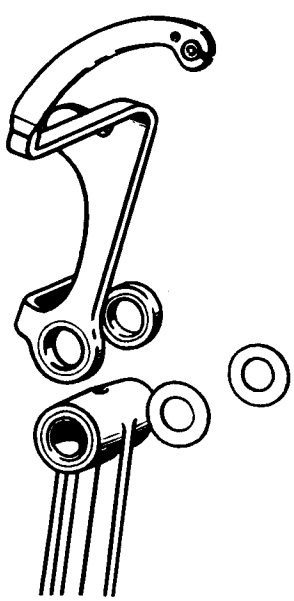
1



2

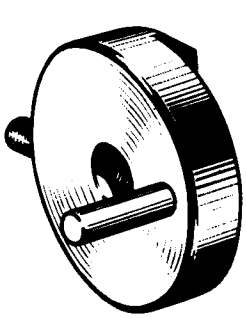
Disconnect cradle and pivot it outwards to remove needle bar connecting rod and thread take-up lever

3



4

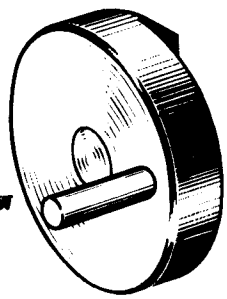
Remove counterweight



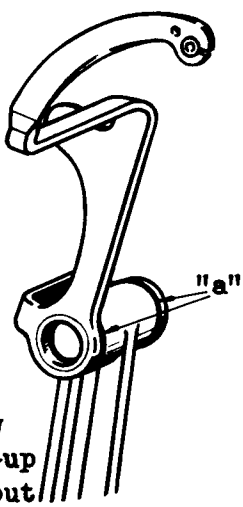
ASSEMBLY

1

Refit new counter-weight and block the counter-weight screw within the hole in the upper shaft

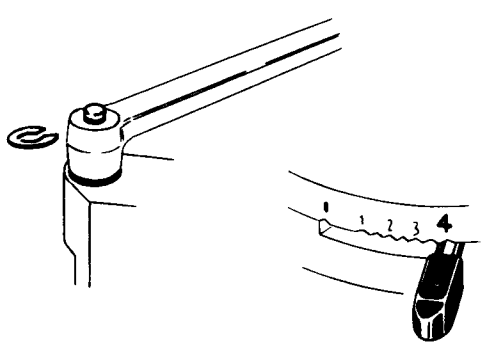


2

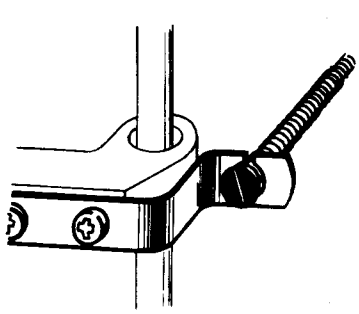


Refit new needle bar connecting rod with new thread take-up lever, without forgetting the washers "a"

3



4



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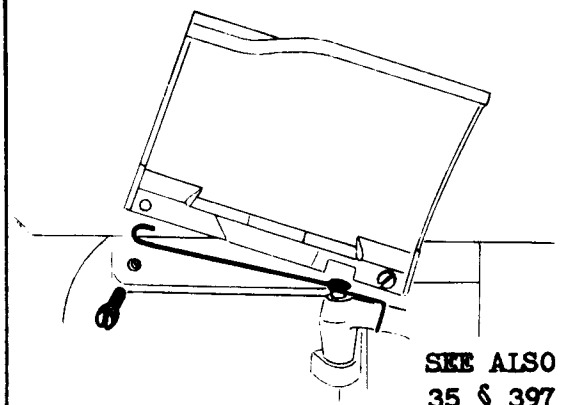
December 1960
Repairs Industrial

REPLACEMENT OF STITCH WIDTH KNOB

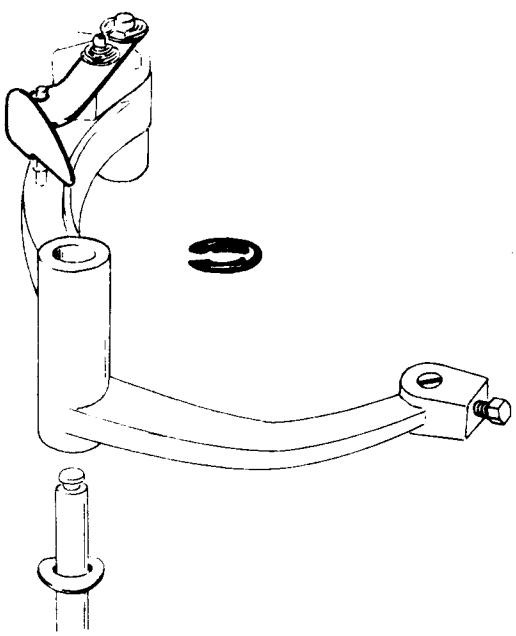
DISMANTLING

1

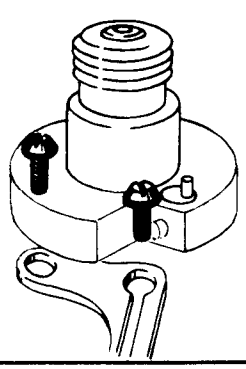


SEE ALSO TIB
35 § 397

2



3



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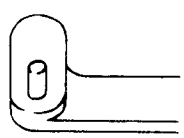
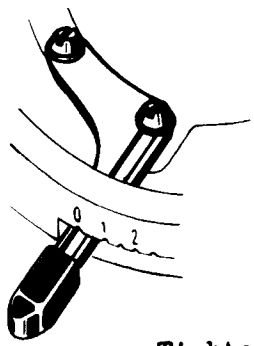


Disconnect
CRADLE LEVER

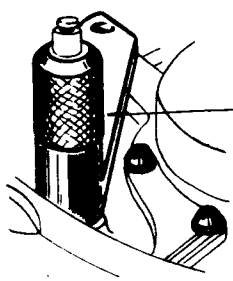
ASSEMBLY

1



Tighten the SCREWS
slightly

2

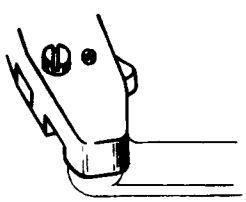


SEE TIB 34 § 371
TIB § 417/4 A/2

Gauge 11'025

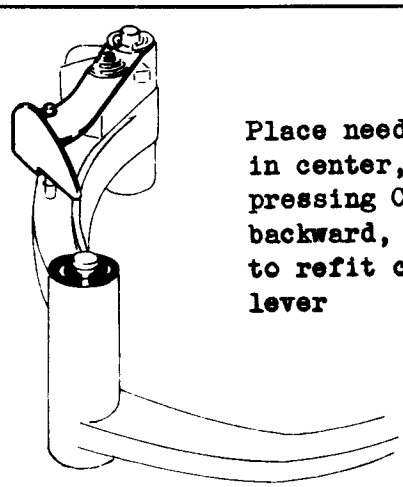
Tighten the SCREWS
altogether

3



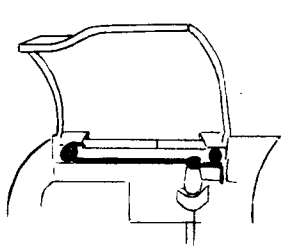
Replace CRADLE
LEVER

4



Place needle bar
in center, by
pressing CRADLE
backward, in order
to refit centering
lever

5



ADJUSTMENTS : 2-3

1006

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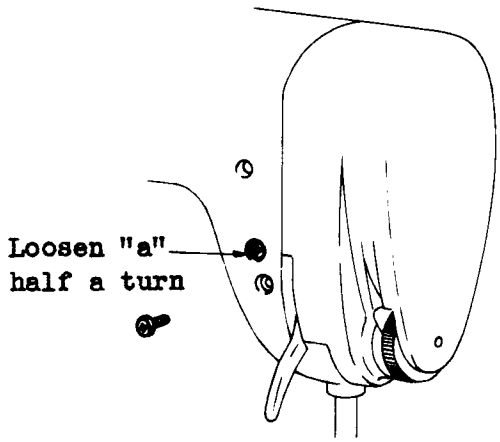
REPLACEMENT OF THE CABLE OF THE PRESSER FOOT LEVER

DISMANTLING

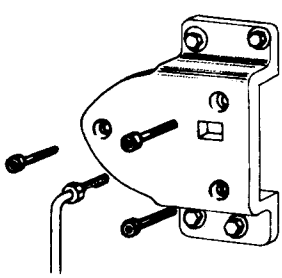
1



2

Free the CABLE and tilt the SUPPORT towards the outside

3



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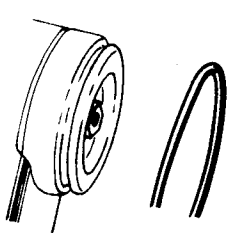
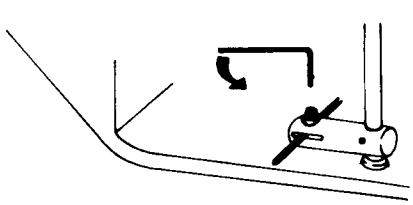


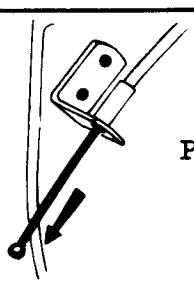
Remove DRIVING BELT of the motor

5



Free end of the CABLE

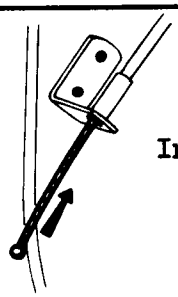
6



Pull out the CABLE

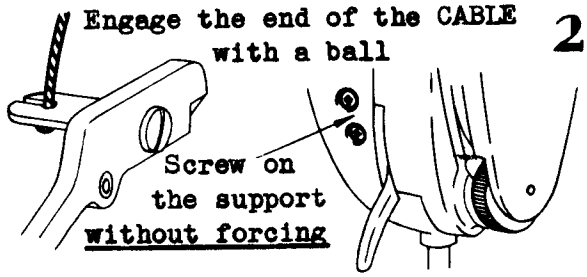
ASSEMBLY

1

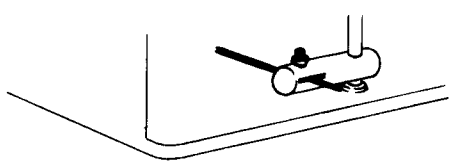


Insert the new CABLE

2

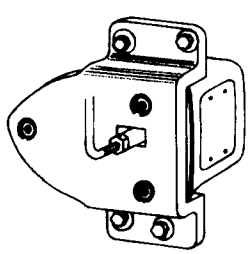


3



Insert the other end of the CABLE and adjust its length

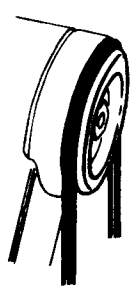
4



Adjust the knee lever

5

Put the DRIVING BELT of the motor in place again



1007a

Printed in Switzerland

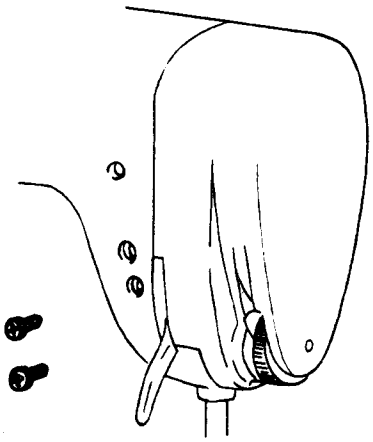
Oktober 1961

Repairs Industrial

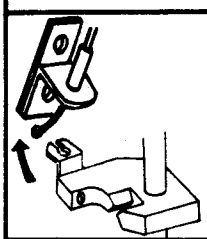
REPLACEMENT OF THE CABLE OF THE PRESSER FOOT LEVER

DISMANTLING

1

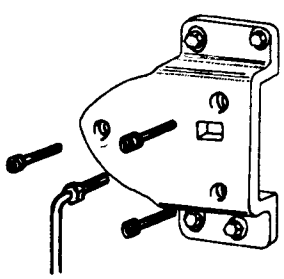


2



Free the CABLE and remove SUPPORT

3



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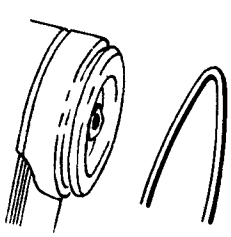
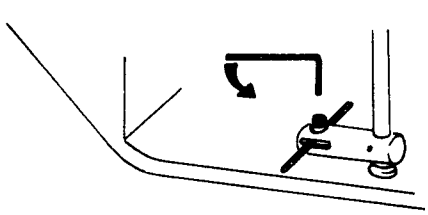


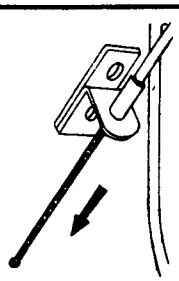
Remove DRIVING BELT of the motor

5



Free end of the CABLE

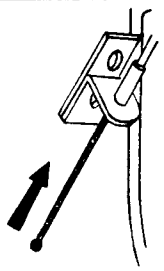
6



Pull out the CABLE

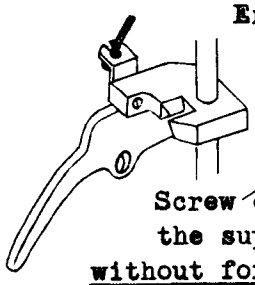
ASSEMBLY

1



Insert the new CABLE

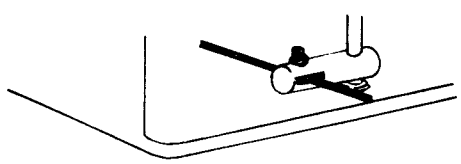
2



Engage the end of the CABLE with a ball

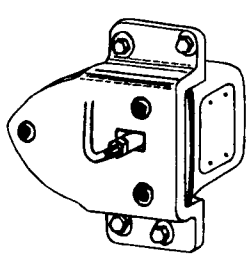
Screw on the support without forcing

3



Insert the other end of the CABLE and adjust its length

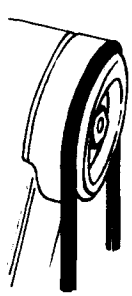
4



Adjust the knee lever

5

Put the DRIVING BELT of the motor in place again

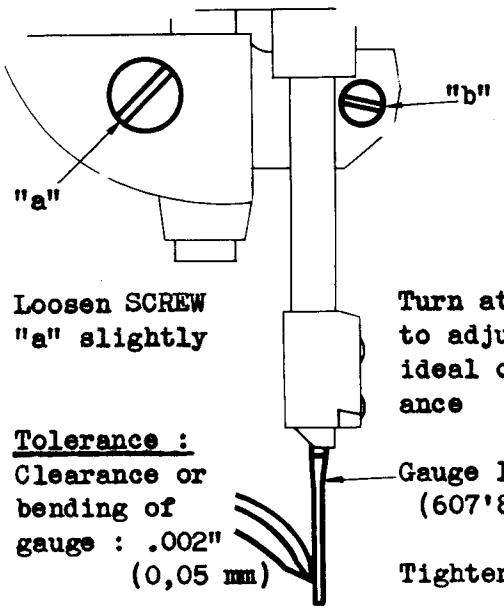


1007b

Printed in Switzerland
November 1961
Repairs Industrial

Printed in Switzerland
Oktober 1961
Adjustments Industrial

NEEDLE CLEARANCE 1



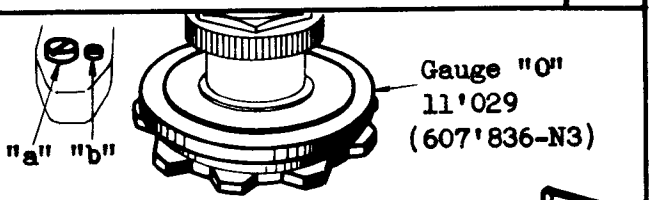
Loosen SCREW "a" slightly

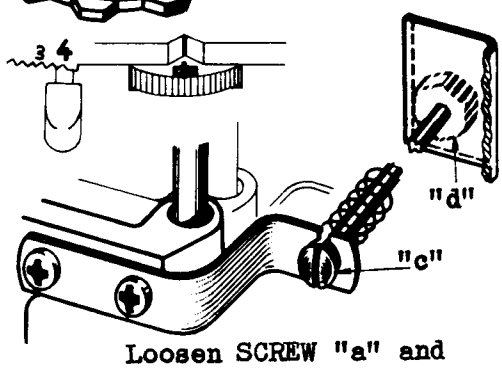
Turn at "b" to adjust ideal clearance

Tolerance :
Clearance or bending of gauge : .002" (0,05 mm)

Tighten "a"

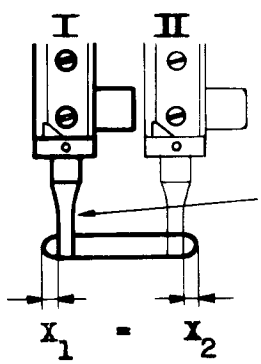
NEEDLE BAR SWING 2





Loosen SCREW "a" and adjust "b" to obtain the ideal swing :

$X_1 = X_2$

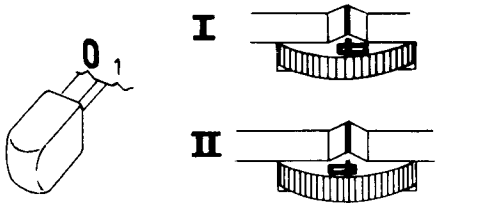


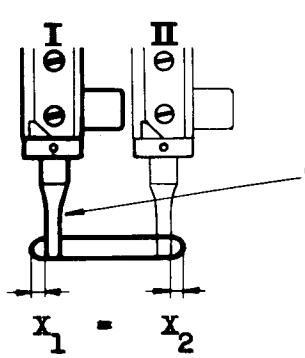
Tighten "a"

Left swing : allow a very slight clearance for SCREW "c"

Tighten NUT "d"

CENTERING 3



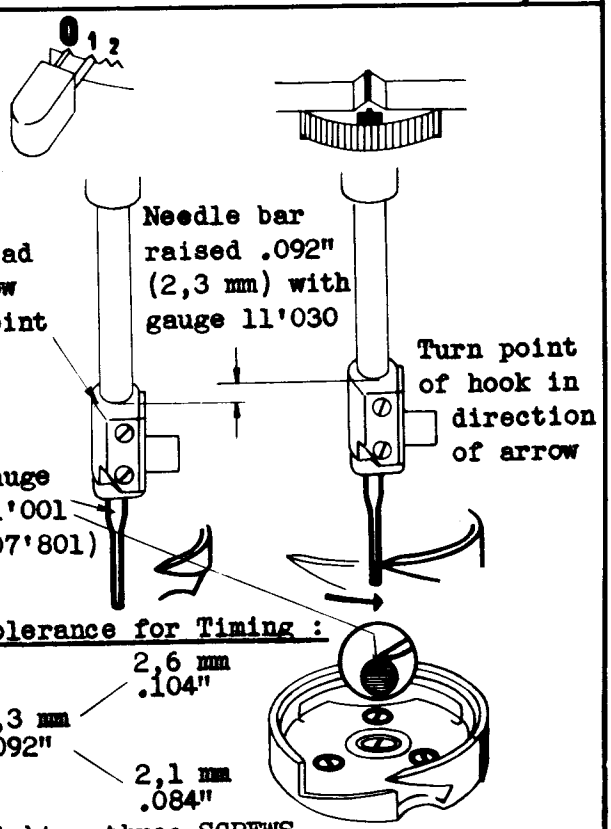


Loosen SCREW "a" slightly and turn "b" to obtain ideal centering

$X_1 = X_2$

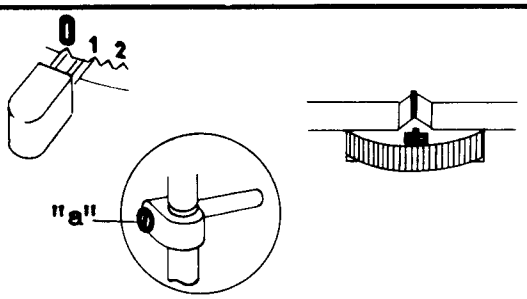
Tighten "a"

TIMING 4



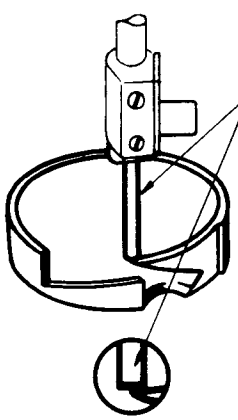
Tighten three SCREWS progressively so the hook remains perfectly "flat"

HEIGHT OF NEEDLE BAR 5



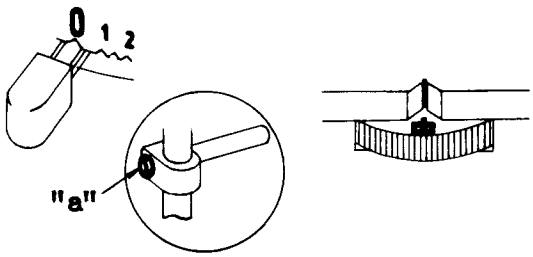
Loosen SCREW "a" to cause centre of gauge to lie on point of hook

Tighten "a"



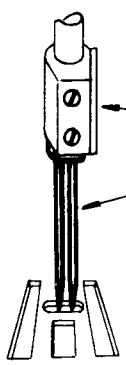
Gauge 11'000 (607'800)

ORIENTATION OF NEEDLE BAR 6



Loosen SCREW "a" just enough to be able to turn needle bar

Tighten "a"

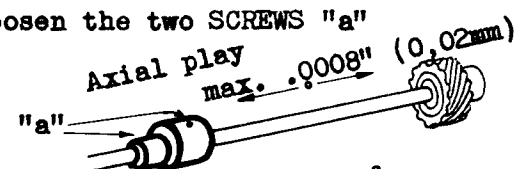


Twin needle clamp

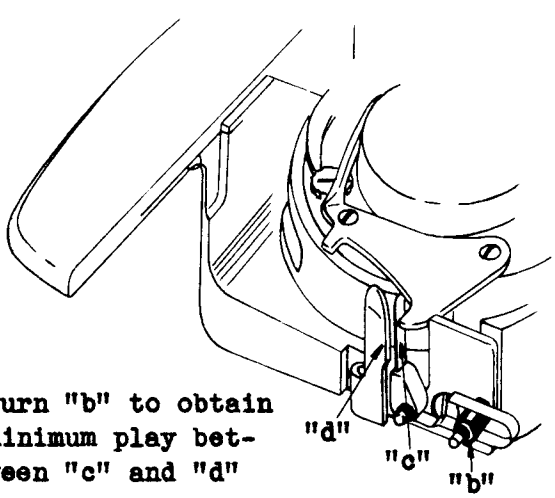
Needles 80 (12) or gauges 11'001 (607'801)

STOP SPRING ADJ. / LOW.SHAFT 7

Loosen the two SCREWS "a"



SEE TIB § 586 A/2 C1

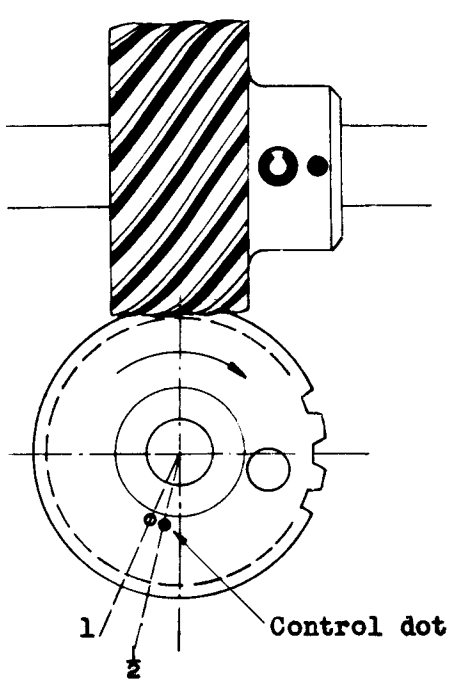


Turn "b" to obtain minimum play between "c" and "d"

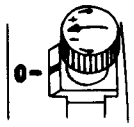
If guard rings vibrate, turn "b" until vibration is eliminated at all speeds

FEED GEAR 8

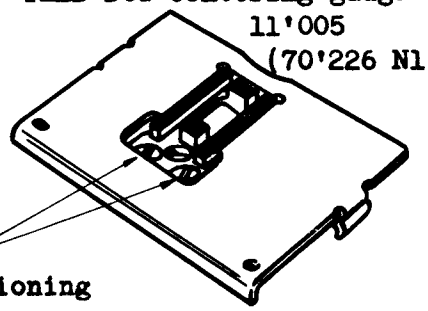
Needle bar at lower dead point



FEED DOG 9



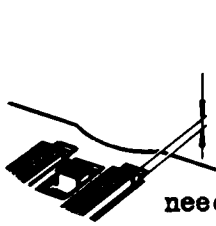
FEED DOG centering gauge 11'005 (70'226 N1)



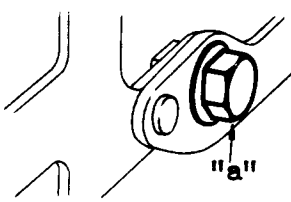
Work cover 11'014

Fasten the two SCREWS after positioning

Support FEED DOG with screwdriver for tightening

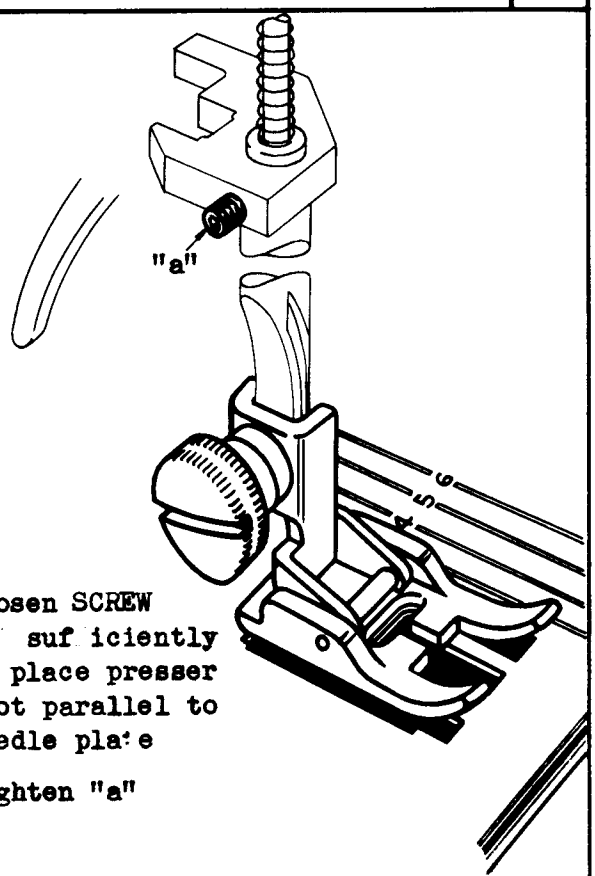


Adjust height at 1,2 (with needle plate, by turning "a" so that FEED DOG moves upwards



Feed dog must not touch needle plate at 4 FWD and 4 REV

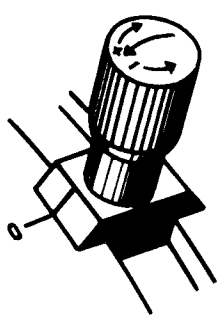
PRESSER BAR ORIENTATION 10



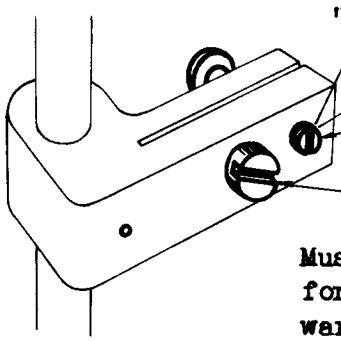
Loosen SCREW "a" sufficiently to place presser foot parallel to needle plate

Tighten "a"

STITCH LENGTH 11



shortens lengthens the "forward" stitch



Loosen "a", adjust "b"

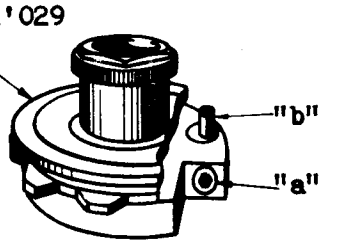
Must neither feed forward nor backward at "0"

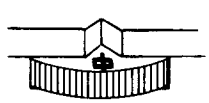
Tighten "a"

SEE TIB 18 § 107

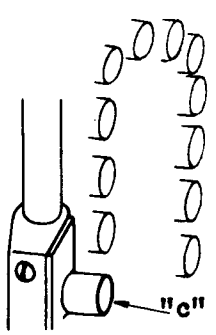
ELNA-DISC DRIVE 12

Gauge "0" 11'029 (607'836-N3)



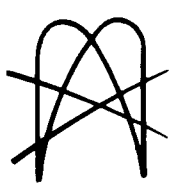


Run the machine at full speed, observe reflection of light on stud "c"



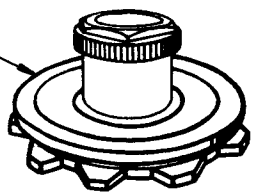
Loosen "a", adjust "b"

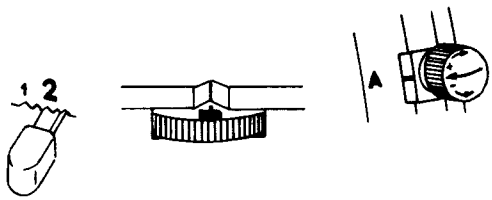
Tighten "a"



AUTOMATIC CLOTH FEED 13

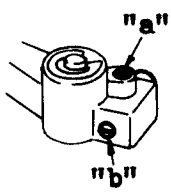
Gauge "0"
11'029
(607'836-N3)





Loosen "a", adjust "b" to have neither forward nor backward feed at ⊖

Tighten "a"

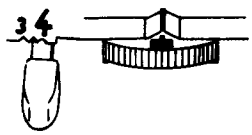


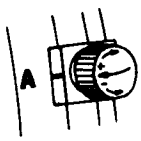
Must advance at ⊕

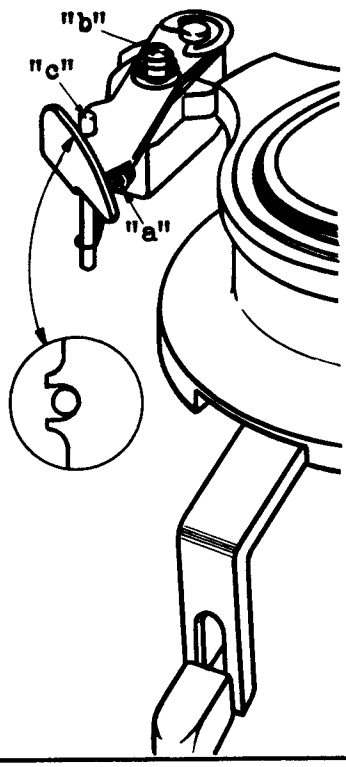
Must move back at ⊖

Advance and return practically equal

BUTTONHOLE-DISC 14







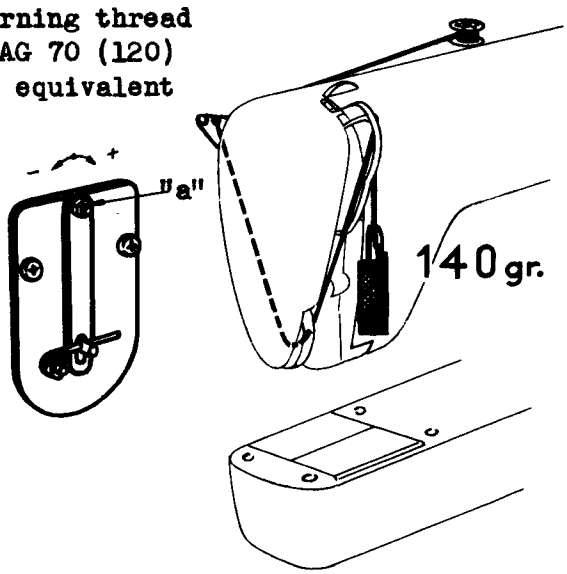
Loosen "a", adjust "b" until key lever presses from the right on pin "c"

Tighten "a"

SEE TIB 33 § 1-2

UPPER UNIVERSAL TENSION 15

Darning thread
UFAG 70 (120)
or equivalent



4¼ : falls slowly

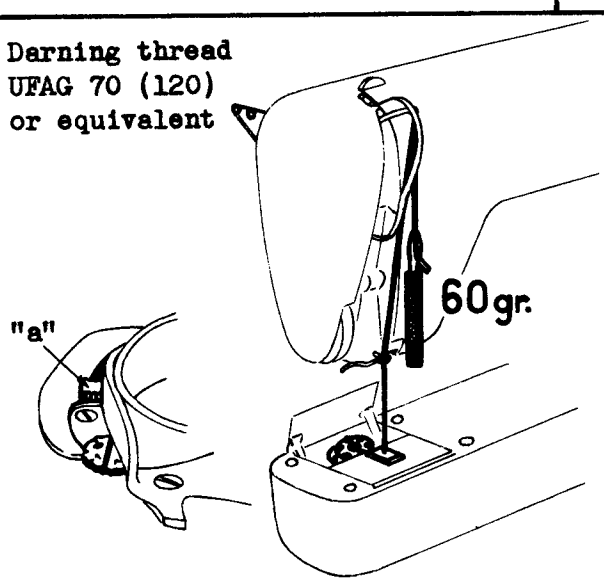
4½ : stops

Turn nut "a" to adjust

SEE TIB § 610 C/3

LOWER UNIVERSAL TENSION 16

Darning thread
UFAG 70 (120)
or equivalent



¾ : falls slowly

1 : stops

Loosen guard ring beak to be able to turn lower tension axle "a"

After adjustment, tighten guard ring beak screws

SEE TIB § 610 C/3

SPECIAL EDITION

elna *

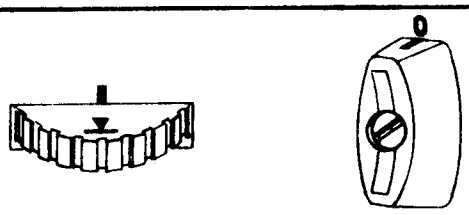
MECHANICS' GUIDE

CLASS	11	ELNA-FREE ARM
"	13	ELNA-FLAT BED
"	21	ELNA ZIG ZAG-FREE ARM
"	23	ELNA ZIG ZAG-FLAT BED
"	41	ELNA AUTOMATIC-FREE ARM
"	43	ELNA AUTOMATIC-FLAT BED
"	62	ELNA SUPERMATIC-FREE ARM
"	64	ELNA SUPERMATIC-FLAT BED

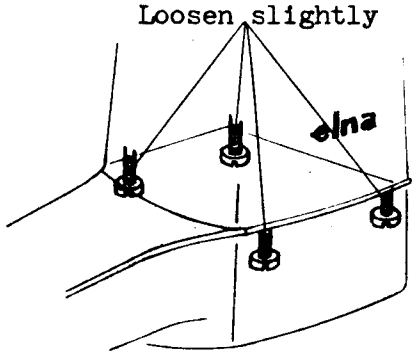
March 1965

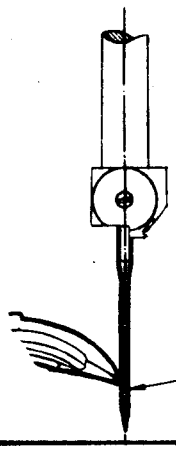
Printed in Switzerland

NEEDLE CLEARANCE - FREE ARM 1



Loosen slightly



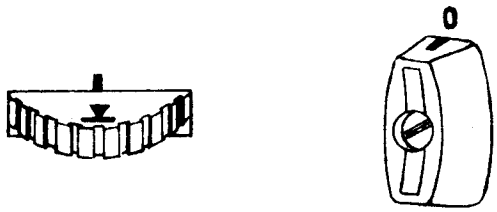


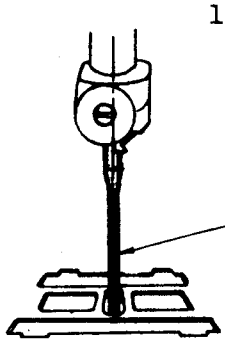
Adjust clearance by moving upper casing in relation to lower casing.
Tighten the 4 screws.

Tolerance:
Clearance or bending of needle: 0,05 mm (.002").

Needle 16 or 100

NEEDLE CLEARANCE - FLAT BED 2

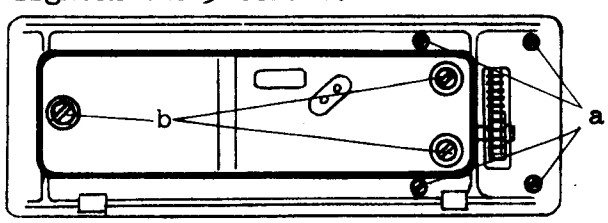




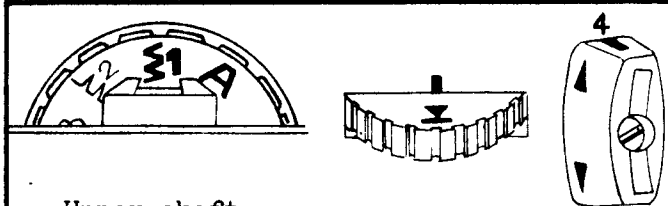
1. Slightly loosen the 4 assembly screws "a". Centre needle in needle plate hole. Tighten the 4 screws.

Needle 16 or 100

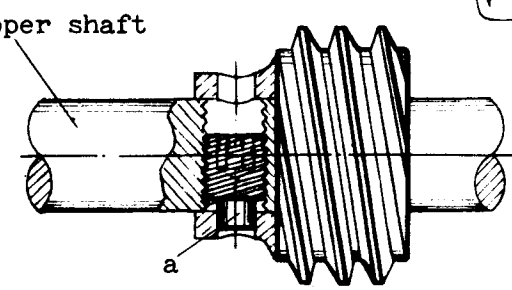
2. Slightly loosen the 3 screws "b". Adjust clearance as per ADJUSTMENT No. 1. Tighten the 3 screws.

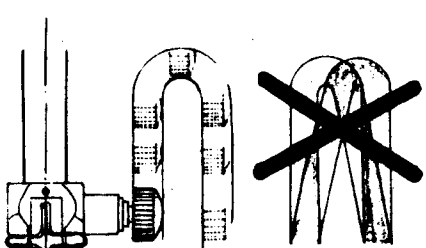


ELNA-DISC DRIVE 21 23 41 43 62 64 3



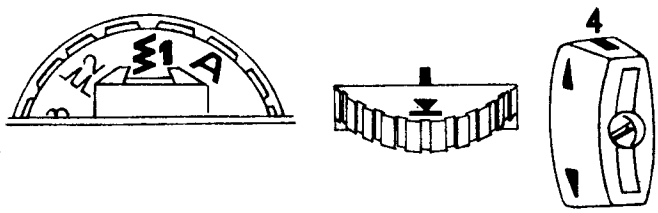
Upper shaft

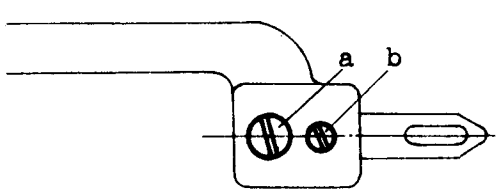




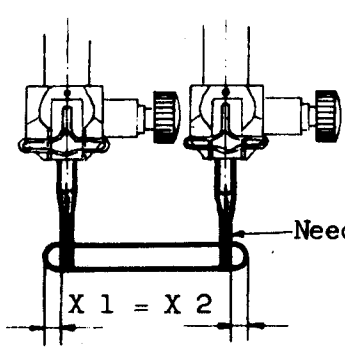
Run machine at full speed and observe needle clamping screw, which must describe an arc.
In order to obtain a correct adjustment, free screw "a" and change the position of the worm (12 holes). Tighten "a".

NEEDLE BAR SWING 21 23 41 43 62 64 4

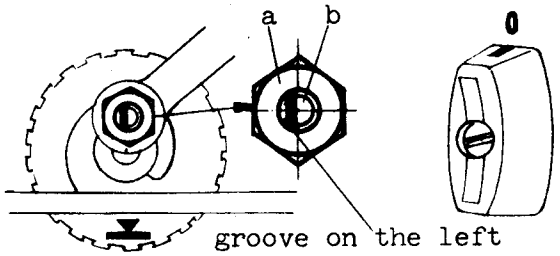




Slightly loosen screw "a" and adjust "b" to obtain the swing: X 1 = X 2
Tighten "a".

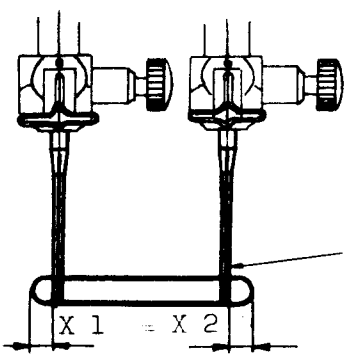


CENTERING 21 23 41 43 62 64 — 5

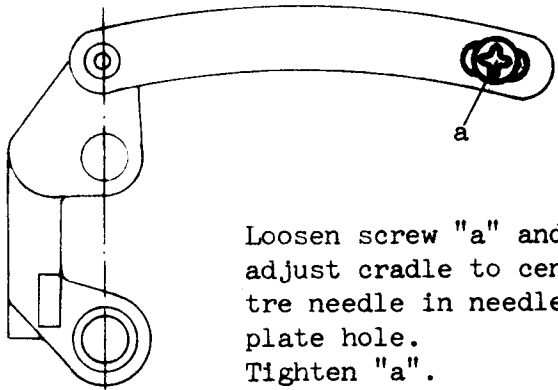


Slightly loosen nut "a" and adjust "b" to obtain the centering: X 1 = X 2

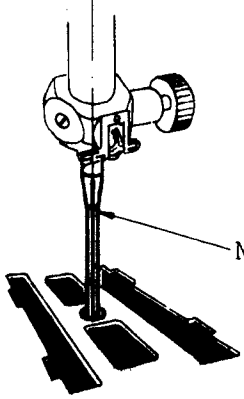
Tighten nut "a" whilst retaining eccentric "b".



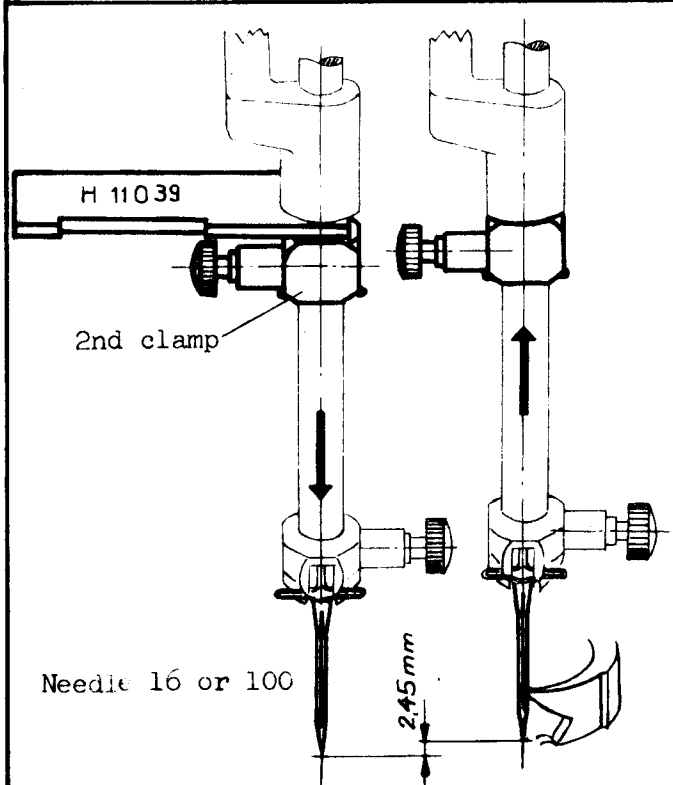
CENTERING 11 13 — 6

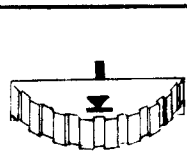


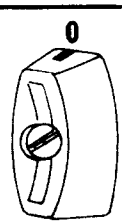
Loosen screw "a" and adjust cradle to centre needle in needle plate hole.
Tighten "a".



HOOK TIMING — 7

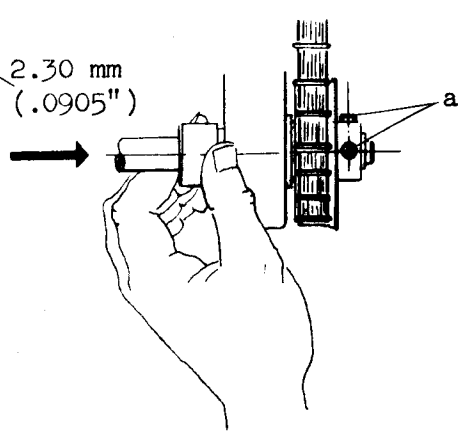






Tolerance:

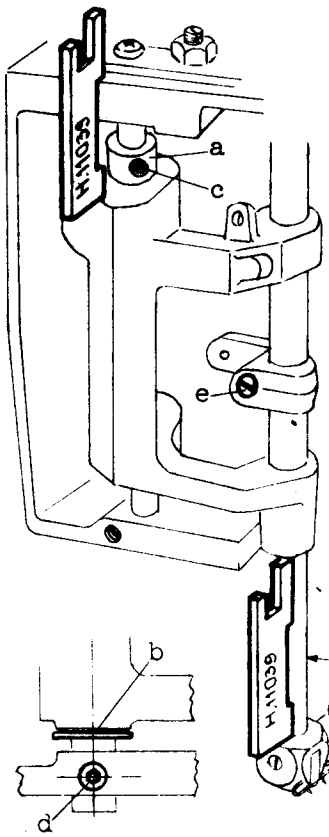
2.60 mm (.1023")
2.45 mm (.0964")
2.30 mm (.0905")



1. Slightly loosen the 2 screws "a". Place needle bar at its lowest position, insert gauge and press 2nd clamp against the latter; tighten needle clamping screw.
2. Remove gauge and turn flywheel towards you until 2nd clamp touches the cradle.
3. Place point of hook behind the centre of the needle by turning lower shaft in the working direction, whilst pressing in the direction of the arrow.
4. Eliminate axial play with driving pinion and tighten the 2 screws "a". Check for free running - without play nor hard points.

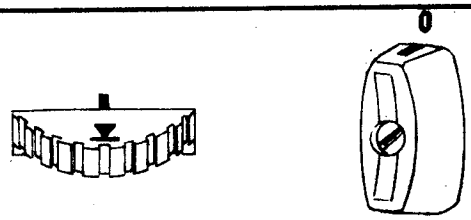
CHECK ADJUSTMENT NO. 11

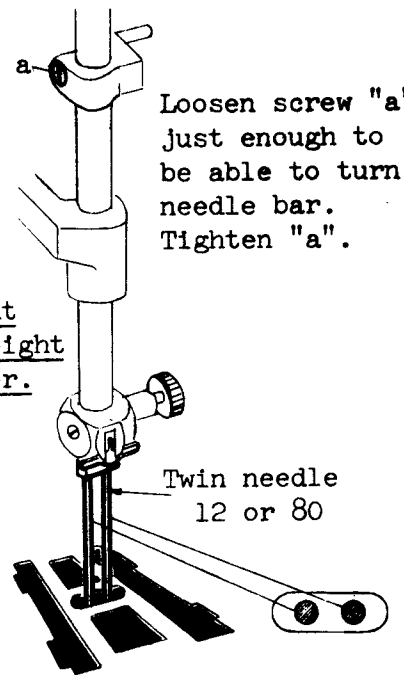
HEIGHT OF CRADLE AND NEEDLE BAR — 8



1. Adjust slight axial play of cradle between stop "a" and washer/clip "b". Tighten "c".
2. Loosen screw "d". Adjust cradle height (26mm-1.03") by lifting cradle axle. Tighten "d".
3. Loosen screw "e" to adjust needle bar height (45 mm - 1.77"). Tighten "e".

ORIENTATION OF NEEDLE BAR — 9



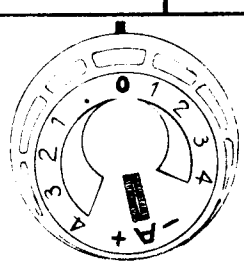


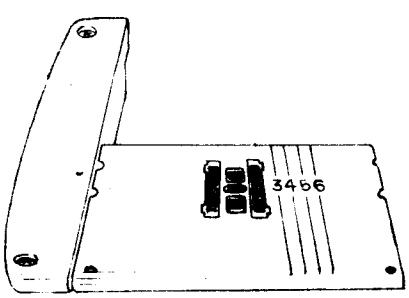
Loosen screw "a" just enough to be able to turn needle bar. Tighten "a".

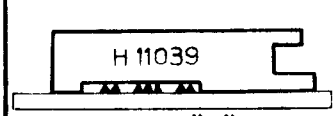
Take care that needle bar height does not alter.

FEED DOG — 10

Position feed dog and fasten the 2 screws. Then tighten them by supporting feed dog with a screwdriver.

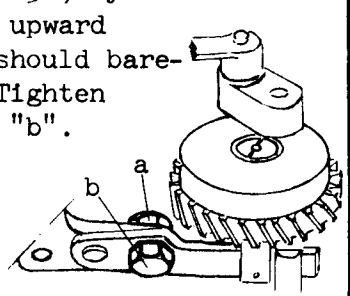




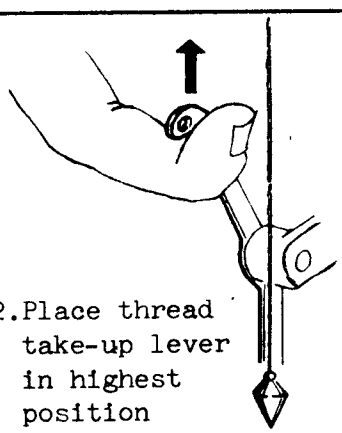


Loosen nut "a" and adjust feed dog height (1.15mm-.045") by turning screw "b" in upward direction. Feed dog should barely touch the gauge. Tighten "a" whilst retaining "b".

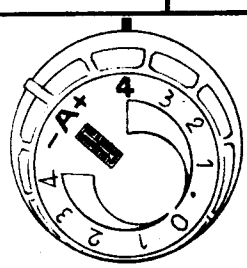
Feed dog must not touch needle plate on 4 FWD. and 4 REV.



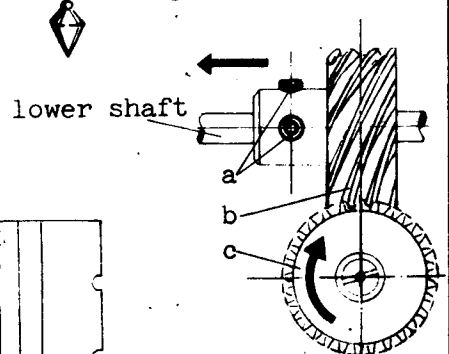
FEED TIMING — 11

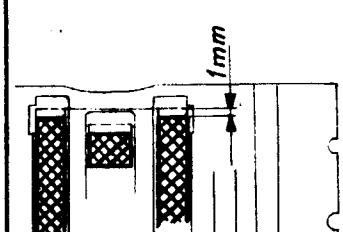


2. Place thread take-up lever in highest position



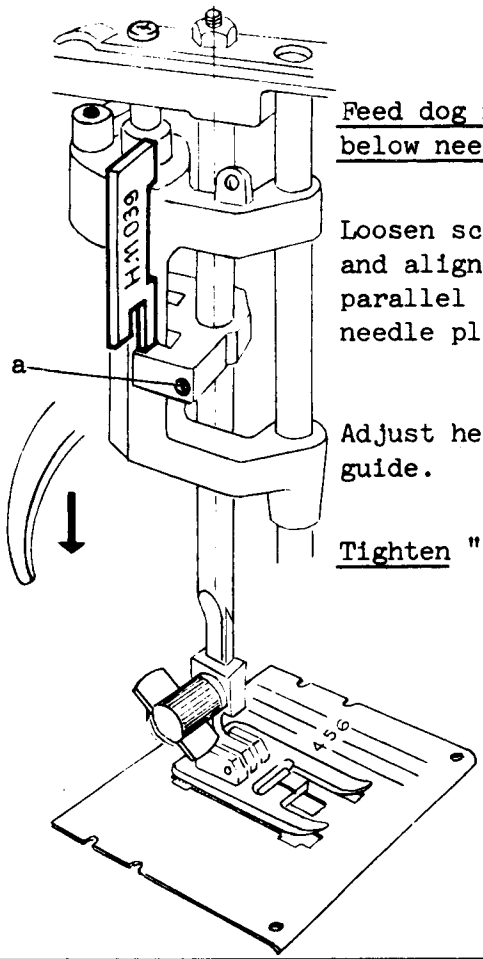
1. Free the 2 screws "a" and disengage pinion "b".





3. Place feed dog as indicated by turning feed gear "c" in direction of arrow. Engage pinion and align it to centre of feed gear. Tighten the 2 screws "a".
Check: When thread take-up lever starts to descend, feed dog should continue to advance 1 mm(.04") further.

PRESSER BAR 12



Feed dog must be below needle plate.

Loosen screw "a" and align foot parallel to needle plate.

Adjust height of guide.

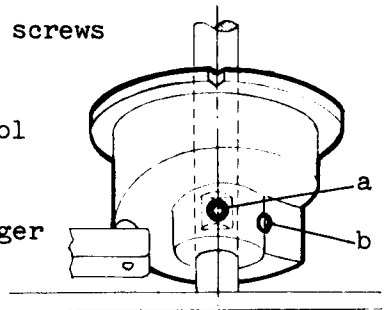
Tighten "a".

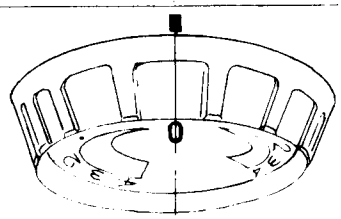
STITCH LENGTH 13

Slightly loosen screws "a" and "b".

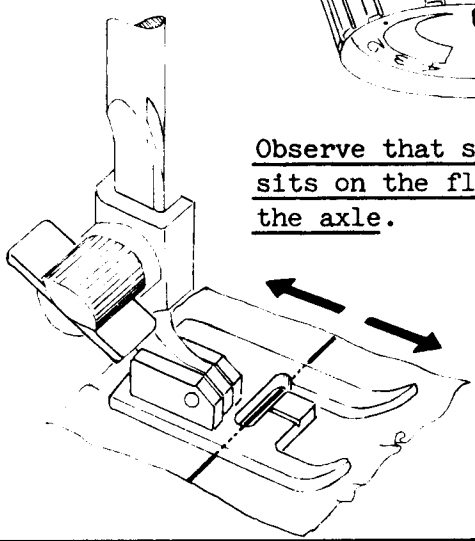
Move feed control cam forward or backward until cloth is no longer fed at "0".

Tighten "a", then "b".



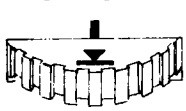


Observe that screw "a" sits on the flat of the axle.



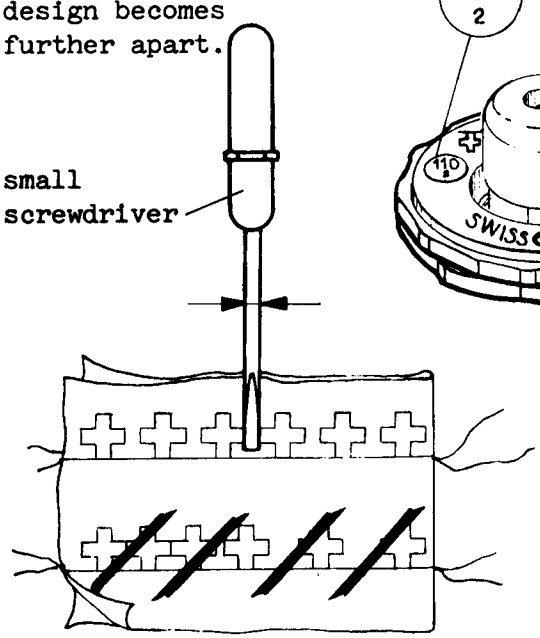
AUTOMATIC FEED 62 64 14

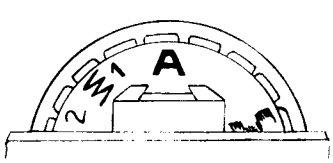
Loosen slightly nut "a".

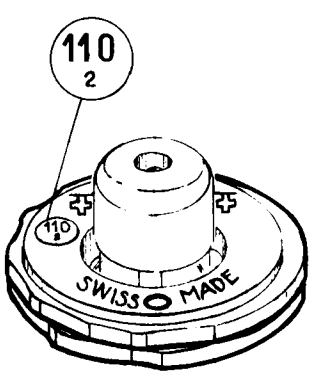


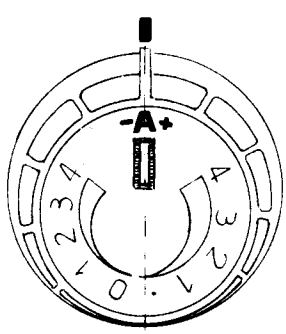
By turning eccentric "b" clockwise, the design becomes further apart.

small screwdriver

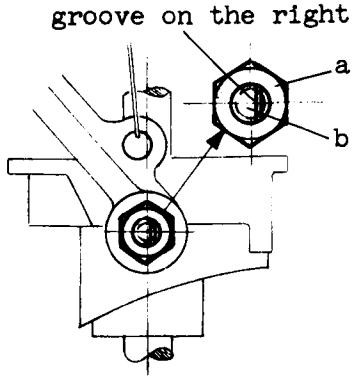








groove on the right

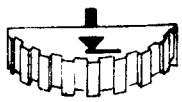


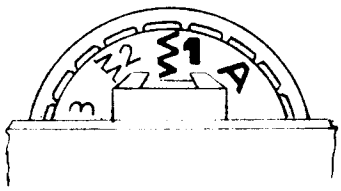
The distance between the crosses should be the width of the small screwdriver.

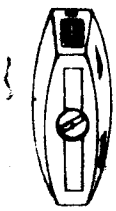
Double check by moving stitch length dial several times from A to 4.

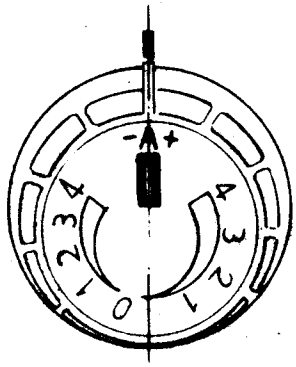
AUTOMATIC BUTTONHOLE FEED 62 64 — 15

No double disc in machine







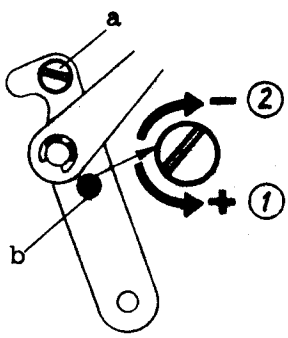


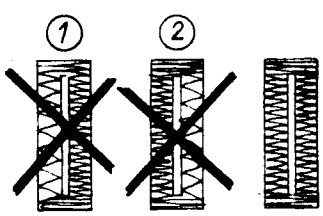
Preparation of machine:
see instruction book

Sew an automatic buttonhole

Slightly free screw "a" and adjust "b" to obtain the same density of stitches forward and reverse.

Tighten "a".

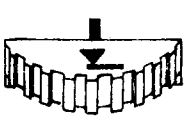


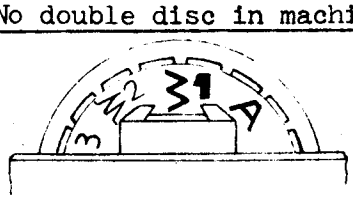


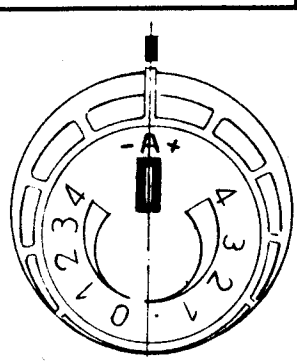
Always adjust on the first row.

AUTOMATIC BUTTONHOLE SPACING 62 64 — 16

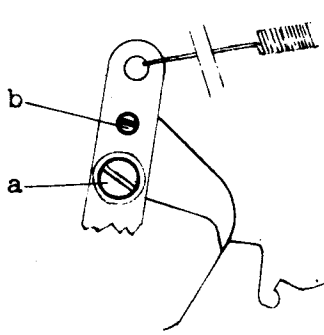
No double disc in machine

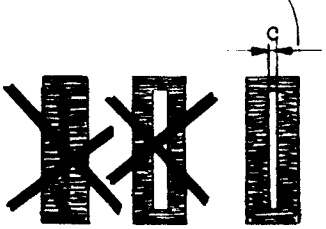


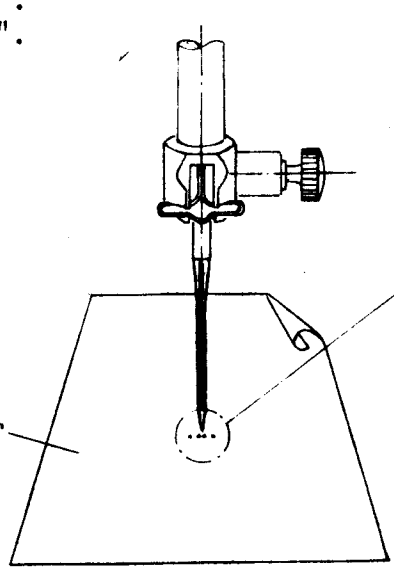


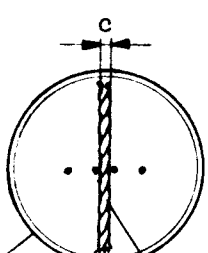


Slightly free screw "a" and adjust "b" to obtain spacing "c".
Tighten "a".





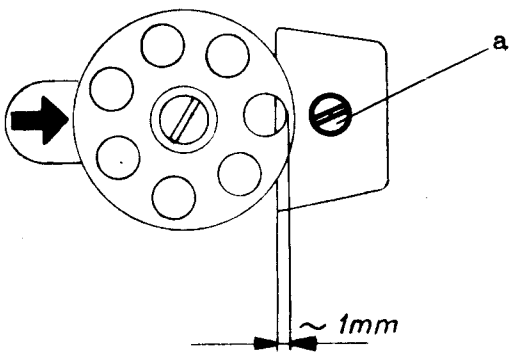




Check:
Stitch width 2:
make 2 slight pricks on the left.
Stitch width 4 and back to 2:
make 2 slight pricks on the right.

BOBBIN WINDING 17

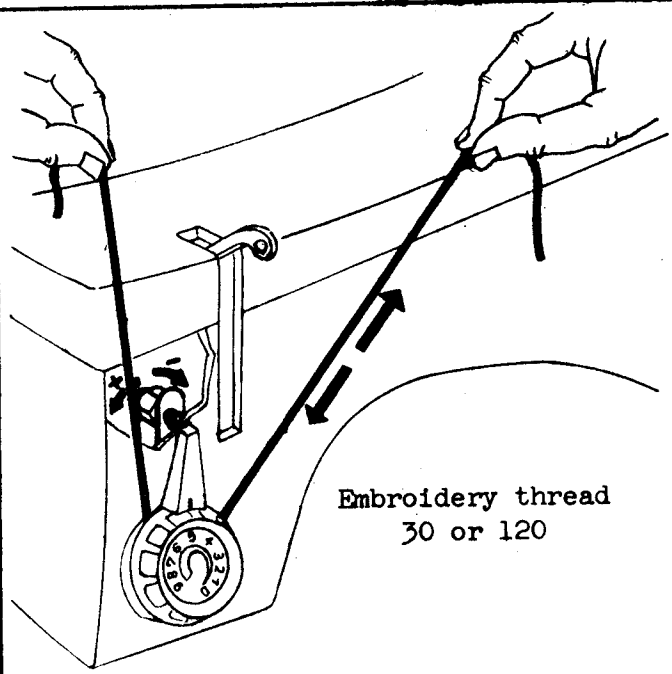
Loosen coupling knob half a turn



Loosen screw "a" to obtain an overleap of about 1 mm (.04").

Tighten "a".

UPPER TENSION 18



Embroidery thread 30 or 120

At "0" there should be no tension.

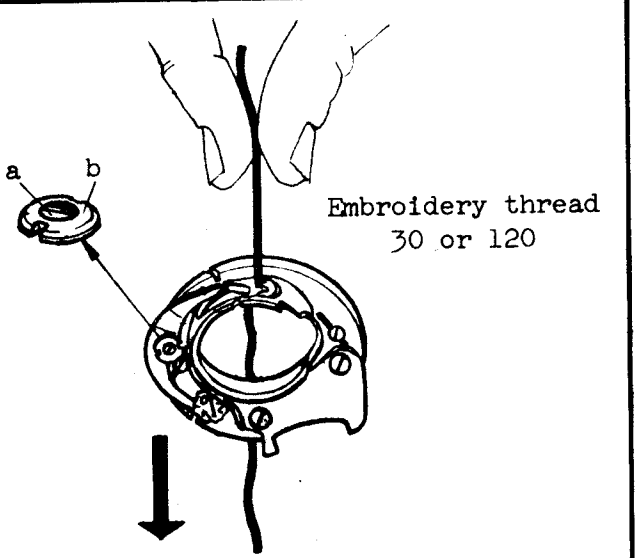
At "1" there should be a little drag.

Turn nut:

to the left to increase

to the right to decrease

LOWER TENSION 19



Embroidery thread 30 or 120

$\frac{1}{2}$: should fall slowly $\frac{3}{4}$: should stop

Slightly loosen screw "a" and adjust "b". Tighten "a".

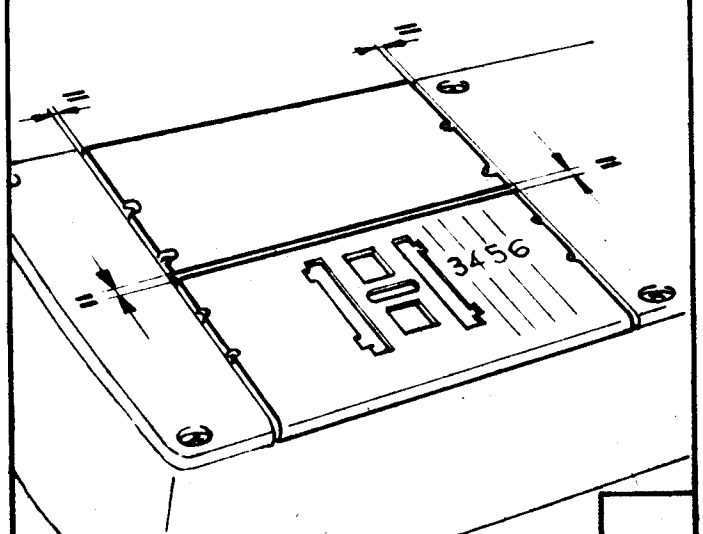
increase

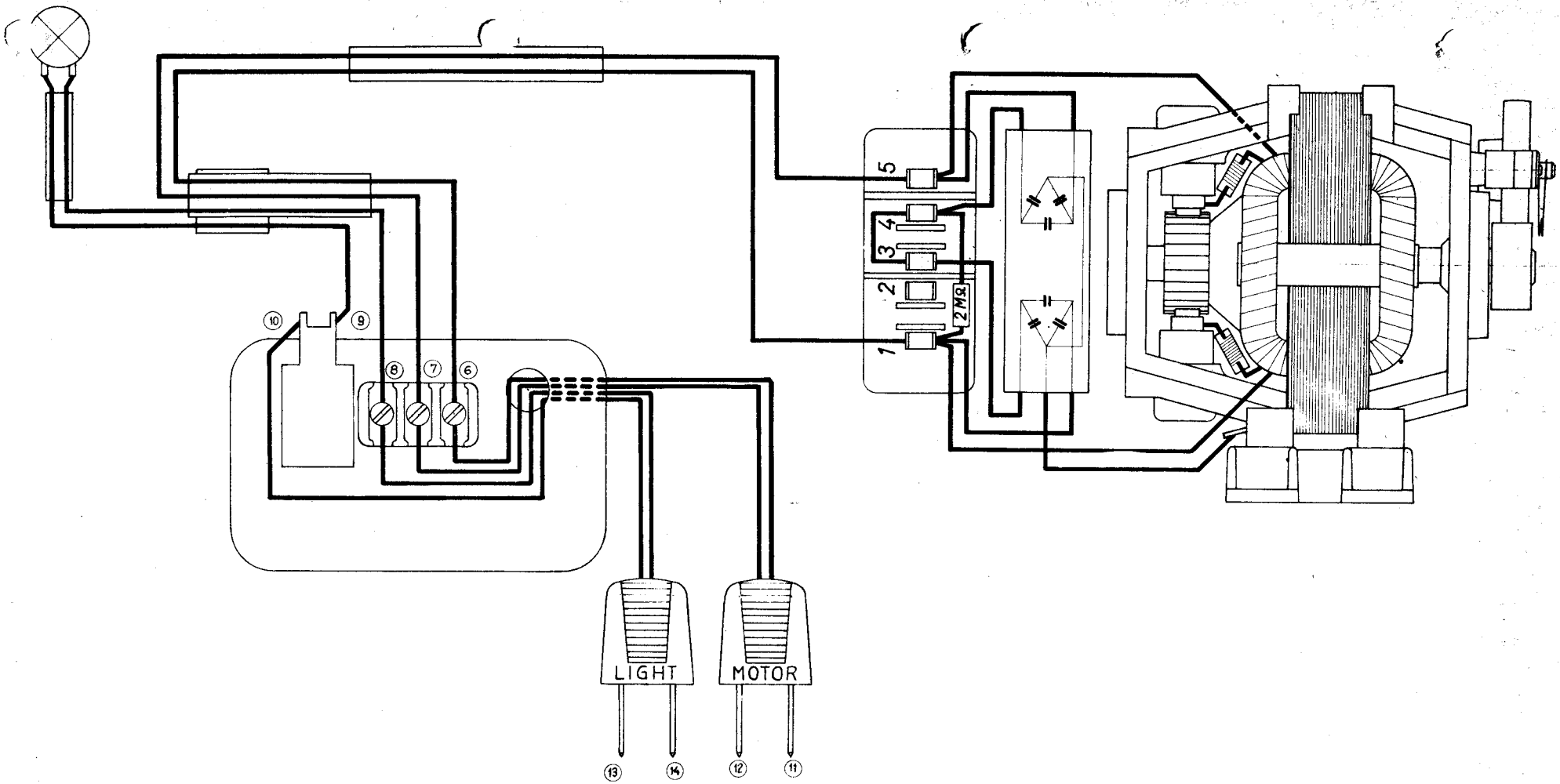
decrease

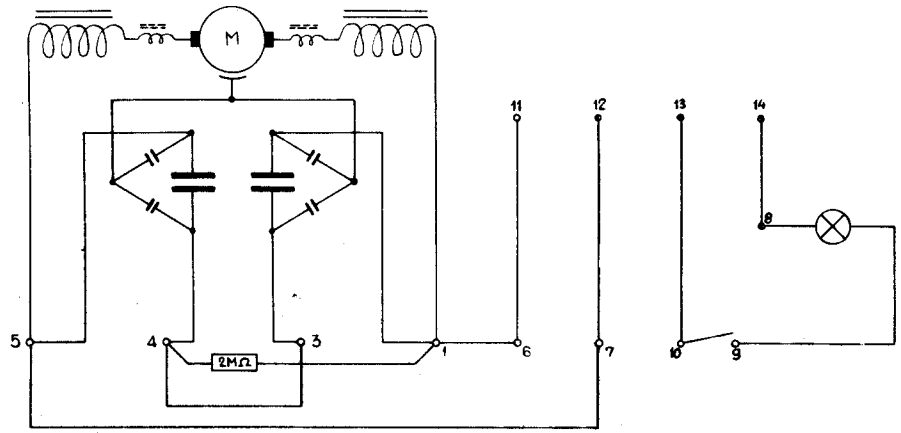
Important:
Move tension dial several times from "0" to "2" and double check the above adjustment.

CENTERING OF SEPARATING PLATE 20

1. Place separating plate and tighten screws slightly.
2. Align separating plate with the needle plate and make sure that it is parallel.
3. Tighten screws.

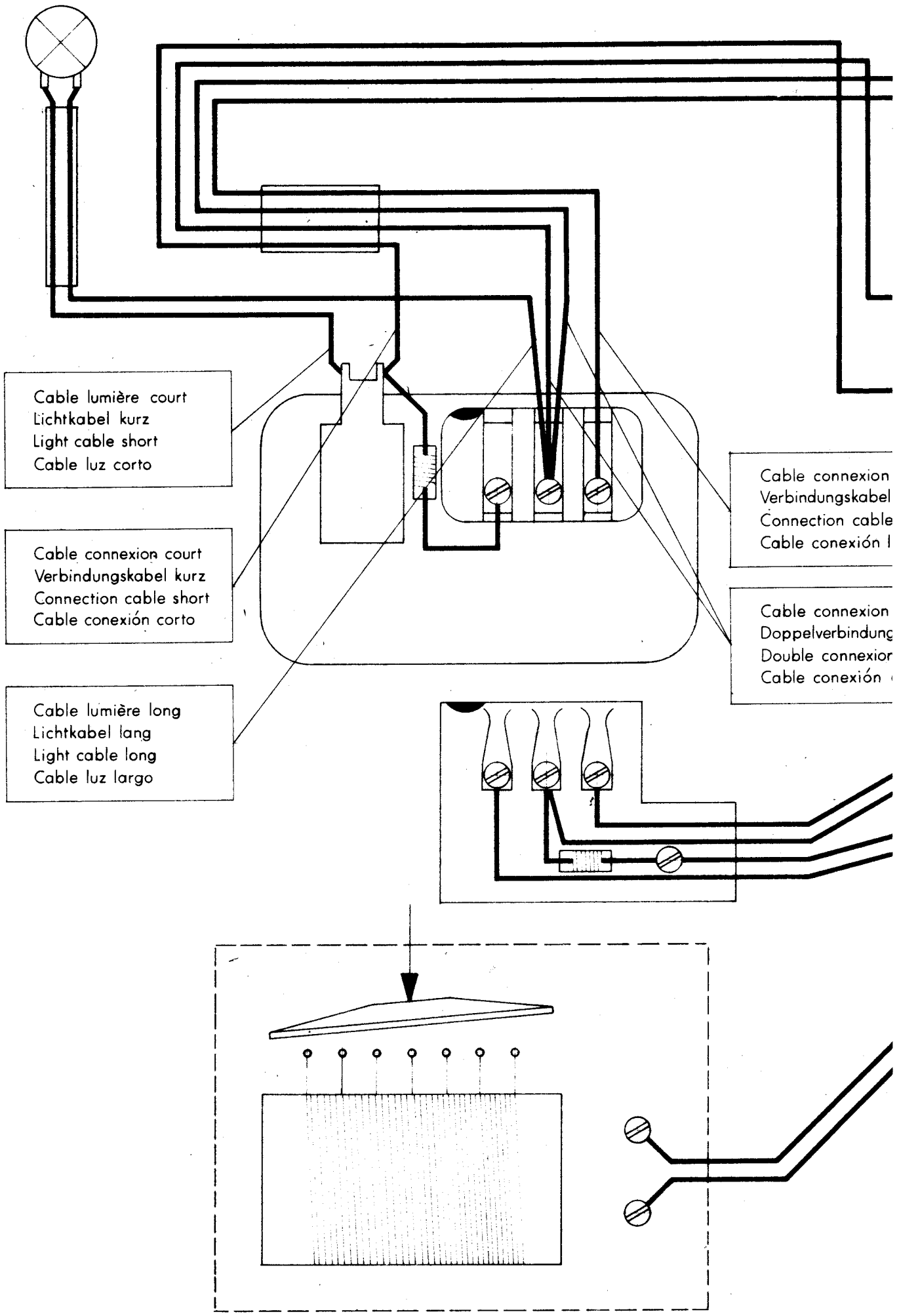


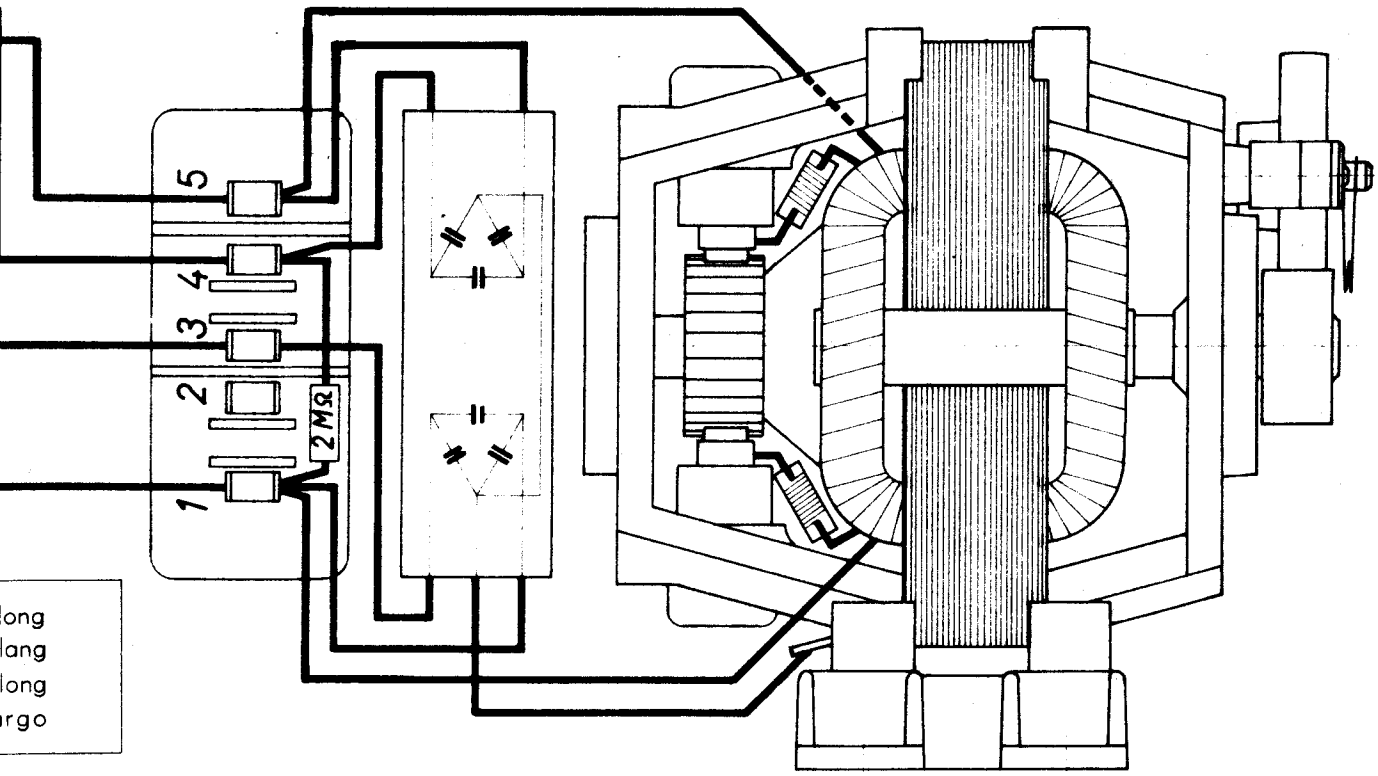




Plana USA

Plana Canada


Cable lumière court
Lichtkabel kurz
Light cable short
Cable luz corto
Cable connexion court
Verbindungskabel kurz
Connection cable short
Cable conexión corto
Cable lumière long
Lichtkabel lang
Light cable long
Cable luz largo
Cable connexion
Verbindungskabel
Connection cable
Cable conexión
Cable connexion
Doppelverbindung
Double connexion
Cable conexión



long
lang
long
rgo

double
skabel
cable
oble