

REPAIR INSTRUCTIONS SM

The following instructions for repairs of Portable Typewriters, Model SM, are preliminary instructions which should assist mechanics to trace and remove defects more quickly.

They have been divided into 4 Sections :-

- I. Removal and replacement
- II. Repairs
- III. Adjustments
- IV. Auxiliary tools

The various numbers mentioned in the Illustrations refer to the Spare Part numbers of these Sections. It is therefore advisable to use these instructions for repair in connection with the Spare Part Catalogue.

When necessary, additional pages will be added to these instructions.

Wilhelmshaven, the 29th June 1955

I N D E X

Instructions for Removing and Replacing

- 1/1 Machine from Casing
- 1/2 Carriage
- 1/3 Platen
- 1/4 Ratchet and Freehead mechanism
- 1/5 Paper feed pan
- 1/6 Line spacer
- 1/7 Alignment guide
- 1/8 Line space lever
- 1/8a Line space lever (new model)
- 1/9 Paper bail
- 1/10 Line space spring
- 1/10a Line space spring (new model)
- 1/11 Paper feed
- 1/12 Margin stop and rack
- 1/13 Left and right shift key lever
- 1/14 U-Bar
- 1/15 Type bar guide
- 1/16 Lever and Pawl of Back spacer shift key
- 1/17 Ribbon fork
- 1/18 Universal for lifting ribbon
- 1/19 Main-spring drum (complete)
- 1/20 Spiral spring or draw band in main spring drum
- 1/21 Spring drum (new method)
- 1/22 Spiral spring or tension cord (new method)
- 1/23 Ratchet lever for ribbon actuating lever
- 1/24 Escapement
- 1/25 Ribbon mechanism (automatic ribbon reverse)
- 1/26 Carriage main plate with side panels
- 1/27 Type bar
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- 1/29 Key tops
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REPAIRS TO

- 2/1 Line Spacer
- 2/2 Detent for line spacer
- 2/3 Paper feed
- 2/4 Automatic ribbon reverse
- 2/5 Parts of automatic ribbon reverse
- 2/6 Escapement

ADJUSTMENT

- 3/1 Adjustment of margin stop and margin lock
- 3/2 Dismantling, assembling and adjustment of Escapement

AUXILIARY TOOLS

- 4 Mounting Frame

I
R E M O V A L
A N D
R E P L A C E M E N T

REMOVING MACHINE FROM CASING AND REPLACING

Group: Casing

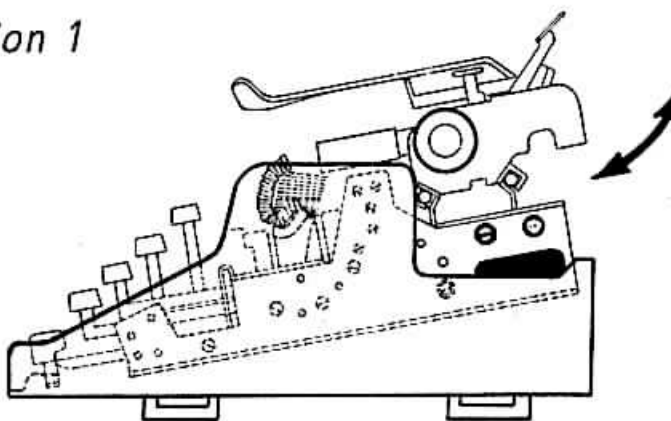
Necessary tools:

- 1 screw driver 250 mm long 8 x 0,6 RW 81
- 1 screw driver 250 mm long 4 x 0,4 RW 81
- 1 spring screw driver

A. Removing

- 1) Take off front cover SStw 1970
- 2) Unscrew front cover plate SStw 1956. Before front cover plate SStw 1956 is unscrewed, mark the position of the top of the front cover plate in relation to frame SStw 1355, so that the correct position of the front cover plate may be again obtained when reassembling.
- 3) Tilt machine with the under-side towards the mechanic. Make a guide line with pencil on both side frame members SSta 1004 and SStw 1007 continuing on to the lower edge of outer case SStw 1355. This pencil guide line serves as a means of finding the correct position of the machine when putting it back into the casing.
- 4) Loosen the four screws 5056 (securing the machine into the casing) and take them out together with rubber disks 5310 and washer 5599.
- 5) Bring the machine back into normal position, with rear towards the mechanic. Raise the whole machine on the carriage, and pull it upwards and back wards out of the casing. (See Illustr. 1.):

Illustration 1



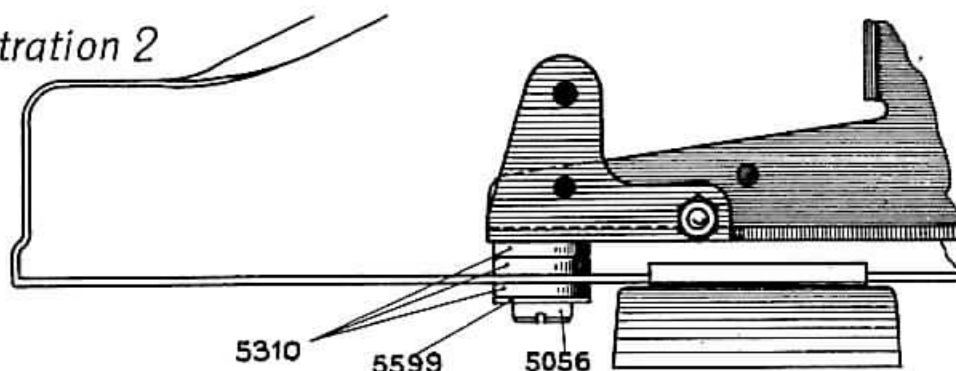
Now the machine is free and can be examined or repaired.

B. Replacing

Replace in reverse order. But the following will have to be specially noted:

- 1) Each of the four securing screws 5066 (machine to outer casing) has 3 rubber disks 5310 and 1 washer 5599. The rubber disks must be inserted in accordance with Illus. 2 Page 2. The thin rubber disk must be placed outside the outer case as shown, otherwise the machine will not bed down correctly.

Illustration 2



- 2) After the machine has been fitted into the casing, it is taken on the lap upside down, so that the 4 screws 5056 can be tightened evenly, the machine being pushed forward in the casing in the direction of the space bar until the pencil guide lines coincide.
- 3) Screws 5056 must be fully tightened.
- 4) Front cover plate SStw 1956 must be brought to the correct height when reassembling, so that on the one hand it will take the front cover SStw 1970 together with the stop springs contained therein correctly, and on the other, does not interfere with the movement of the wire Sta 1052 controlling the ribbon change.
- 5) After the unit has been refitted, the secure and rattle-free seating of the top cover plate should be ensured. Also the space bar should operate freely without any suspicion of binding. The adjustment must continue until these two prints are absolutely correct.

C. Complete exchanging of the outer casing

When the original casing taken from the machine is not to be put back again, for instance if the casing is changed for one of another colour containing no pencil guide lines coinciding with those on the machine attention to the following should be given:

- 1) The unit must be pulled far enough forward in the casing so that the front cover SStw 1970, to be put on later, will fit perfectly into the recess of the casing SStw 1355 its notches lying properly in the two tension springs 5620 of front cover plate SStw 1956. As the retaining springs Stw 1433 of the front cover SStw 1970 are on the two ribbon spools, these should not be moved, but the casing properly seated by the above method only.
- 2) Space bar Stw 1221 must not bind in the casing. The casing must not be adjusted again if it does, otherwise the above adjustment will be lost.
The space bar can, if necessary, be loosened to fit into its recess in the casing so that it moves easily on all sides.

Note: It is advisable, after the typewriter has been taken out of the casing in order to carry out major repairs or exchange to screw it on to the assembly frame RW 32 wherever possible. Even without its outer casing, the typewriter is solidly built, but this steel-plate outer casing is an essential part of the machine and gives it considerably increased rigidity. The assembly frame RW 32 takes the place of the outer casing where it has been removed.

Where RW 32 is not available, it may be found that the escapement mechanism will not function when the machine is flat on the bench without the outer casing. In these cases, replace the four securing screws 5056, which will then raise the machine sufficiently for free movement of the escapement.

Necessary tools:

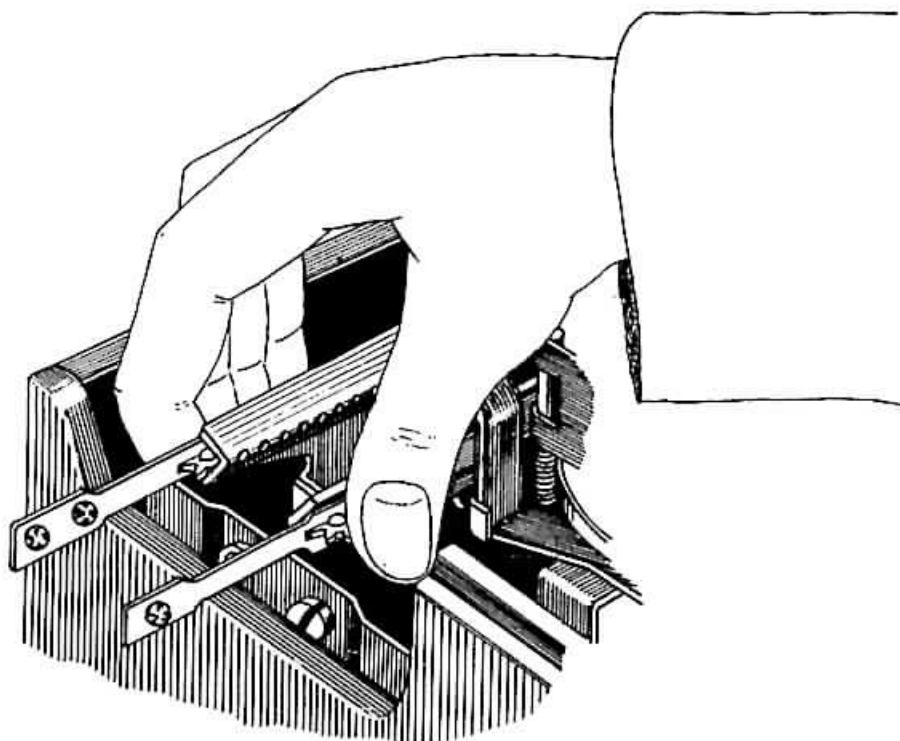
- 1 screw driver 4 x 0,6 RW 81
- 1 flat pliers

A. Removing:

- 1) Stand typewriter with its back towards mechanic and push carriage to the left.
- 2) Remove screw 4829 which serves as carriage stop on end of carriage track SStw 3004. Bend angular flap of carriage track straight. It is important to note this position, as when the carriage is put back, this flap must be again bent into the same angle (On the most recent models, There has been a modification of screw 4829, which cuts out the bent flap).
- 3) Disconnect draw-band Sta 1100 and attach on the right anchor projection on part x1138.
- 4) Push carriage to the right as far as the end stop, press margin release key and strike space bar several times. At the same time, push carriage beyond the end stop and it can now be removed.

B. Replacing:

- 1) Stand typewriter facing mechanic.
- 2) Insert ball races SSsta 1370 into back and front carriage tracks so that the teeth of the star-wheels in the races are engaged with the first hole of the carriage track. With the left hand slip the carriage along the free ends of the ball races until both star-wheels are fully engaged in both carriage tracks (see illustration).

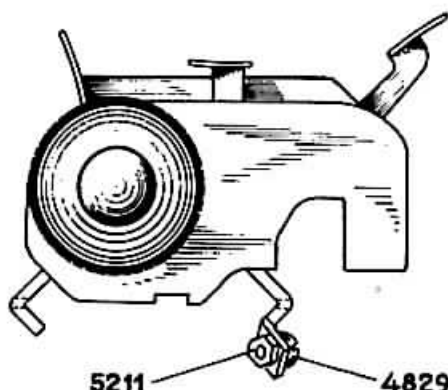


REMOVING AND REPLACING

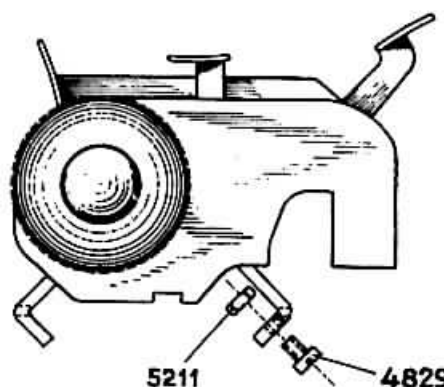
Group: Carriage

- 3) Move carriage freely to ensure that both ball races lie evenly in the carriage tracks.
- 4) Replace drawband Sta 1100
- 5) Push carriage to the extreme right and insert screw 4829 with lock nut 5211.
- 6) Bend angular flap back into former angle (see following illustrations).

Where a machine is fitted with a different number of balls in each ball race, the ball race provided with 4 balls should be fitted into the back carriage track SSta 1077, and the ball race with 2 balls into the front carriage track SSta 1130.



deflected lug of the prism end



straightened lug of the prism end

REMOVING AND REPLACING PLATEN

Group: Carriage

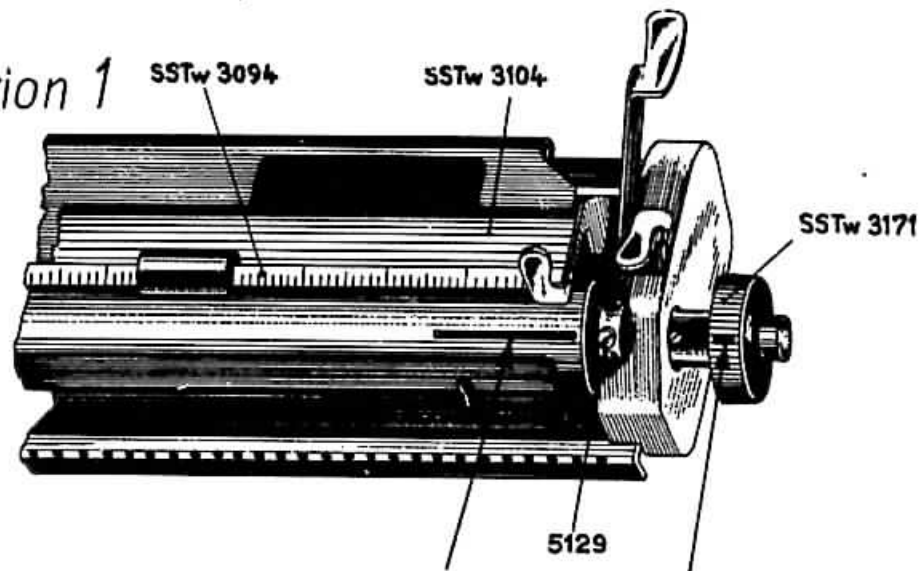
Necessary tools.

- 1 screw driver, short 5 x 0,6 RW 81
- 1 screw driver, short 3 x 0,4 RW 81
- 1 pointed pliers or
- 1 tweezers

A. Removing

- 1) Unscrew left platen knob SStw 3080
- 2) Draw marker lines on right side of platen and right side of cylinder knob SStw 3171 (see following illustration 1)

Illustration 1



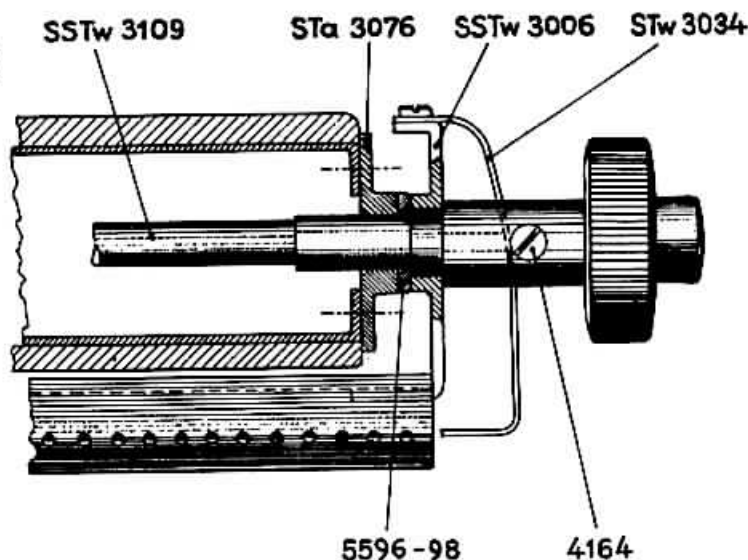
Please adjust the signs of the platen knob in horizontal position in the height of one of the three screws 5129

- 3) Loosen the 3 screws 5129 (do not take out).
- 4) Pull out platen shaft SStw 3109 together with right platen knob 3171.
- 5) Unscrew both front screws 4727a of the right end cover plate Stw 3034, and loosen both back screws 4727a. This provides more room for removing platen.
- 6) Turn up paper bail SStw 3094 and deflecting plate SStw 3104, holding this firmly with the left hand. Remove washer 5596. Insert screw driver between the right end of the platen and right hand carriage cheek, and gradually lever the platen upwards.

B. Replacing

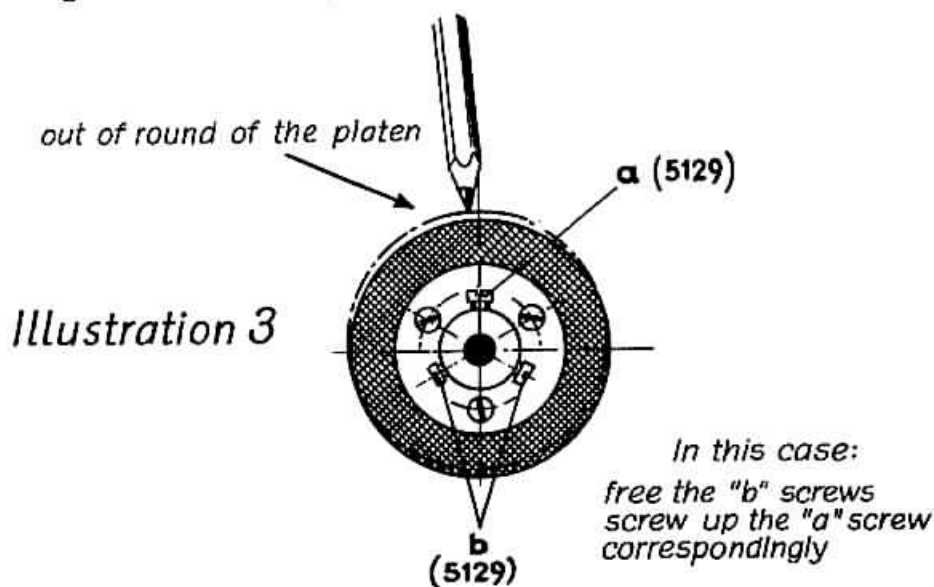
- 1) Turn up paper bail SStw 3094 and deflecting plate 3104, holding the latter firmly. Pull paper release lever SStw 3122 forward.
- 2) With the wheel side of the line spacer the roller is at first set on bearing bush 5947 in the left hand carriage side wall in an inclined position.
- 3) The right end of the platen is inserted with a slight pressure and brought into the correct position, after the right cover Stw 3034 has been slightly pressed to the side with the screw driver.
- 4) With the tweezers or pointed pliers the filling discs 5596-5598 are on the right side pushed between the end of the platen and right carriage side wall and the platen is pulled to the right with the right hand, whereby the filling discs are prevented from falling through.
- 5) Insert platen shaft SStw 3109 with the right platen knob SStw 3171. Thereby looking from the left through the cored shaft towards the platen shaft in order to make the threading of the shaft through ratchet platen cone easier.
- 6) Put paper release lever SStw 3122 again to the back and insert right hand platen knob. (Push it through cover Stw 3034, carriage side wall 3006, filling disc 5596-5598 cover plate 3076). Attention should be paid that the setting screw for knob 4164 fits properly on to cover Stw 3034. This is an indication that the right hand platen knob SStw 3171 is up to the flange end seated in the carriage side wall)
(See illustration 2 below).

Illustration 2



- 7) Make a mark on platen knob SStw 3171 and platen at the same height.

- 8) Tighten screw 5129 slightly all round. Allow knob SStw 3171 sufficient play in order to be able to feel when the screws are in the holes of the platen knob cover. Loosen release lever SStw 3045, at the same time. Examine by means of the free wheel if the roller is not working under tension. After the screws 5129 have been tightened all round by two or three movements the platen has to be centred. Play on the roller which has been caused by one sided tightening of the screws must be rectified. (See following illustration)



- 9) Fix platen knob SStw 3080a on the left (screw over the flat surface of ratchet platen shaft), thereby adjusting the play in the direction of the axle. Ratchet platen knob SStw 3172 must be able to overcome slight spring pressure for the distance of one mm. and subsequent strong spring pressure. This movement can be adjusted to the depth of the insertion of the left platen knob SStw 3080a on the ratchet platen shaft.
- 10) Insert front screw 4727a on front cover plate Stw 3034 and tighten back screw.
A new platen is centred in the same manner.

Necessary tools

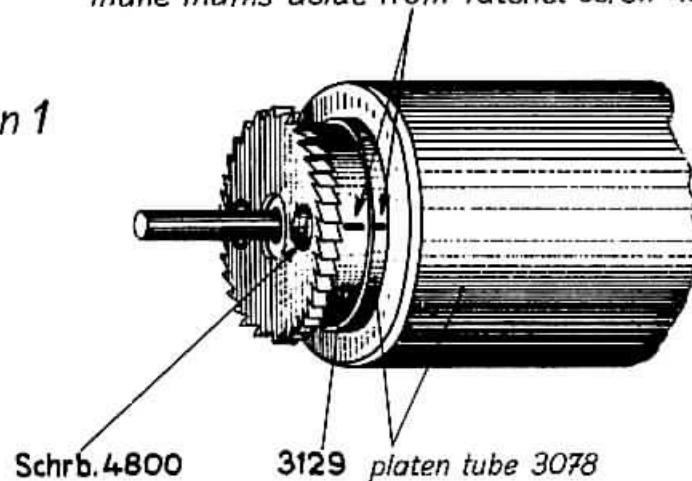
1 short screw driver 3 x 0,4 RW 81

A. Removing

- 1) Remove platen (see instructions for overhaul 1/3)
- 2) Make corresponding mark on ratchet cylinder stroke pressure disc Sta 3129 and two flange of the left platen end by means of pin.

make marks aside from ratchet screw 4800

Illustration 1



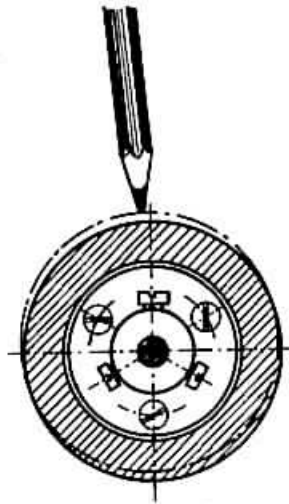
- 3) Insert ratchet cylinder shaft SStw 3109 and release mechanism thereby turning the ratchet wheel 3128 in such manner that the holes on the wheels release both the sunk screws 4800
- 4) Take ratchet cylinder shaft SStw 3109 out again and unscrew the two sunk screws 4800
- 5) Pull the ratchet cylinder mechanism out of the cylinder.

The mechanism can now be easily examined again or repaired. Before taking the mechanism apart pressure disc Sta 3129 should be marked again as well as one of the two shells.

B. Replacing

Replacing of the ratchet cylinder mechanism is carried out in reverse order by paying attention to marking in order to obtain minimum play of roller. For ascertaining of play see illustration 2 page 2. When putting back ratchet cylinder shaft care should be taken that the shoulders of the platen knob fit in to the washers 5596-98 and the carriage side wall 3006. See illustration 3, page 2.

Illustration 2

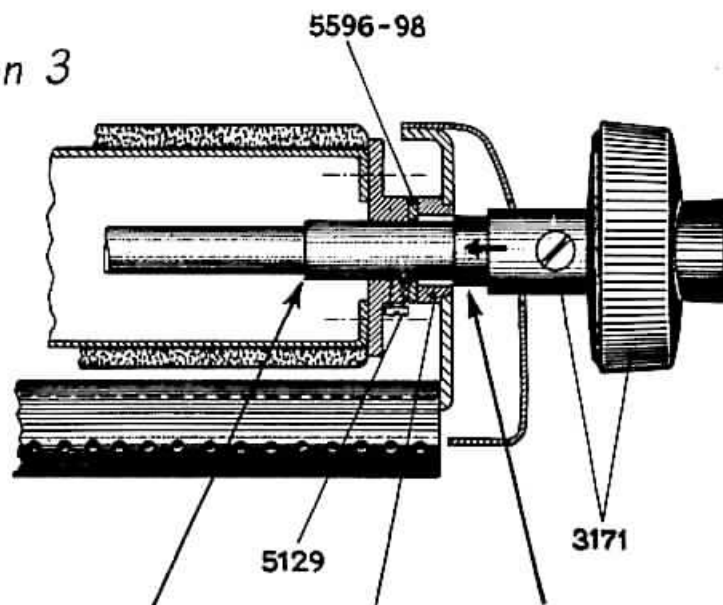


C. Exchange of dismantled ratchet cylinder mechanism

If the dismantled ratchet cylinder mechanism is not to be put back again, but is exchanged for a new one, which of course has no markings, the following points should be observed:

- 1) Bush 5947 in the left carriage side wall SStw 3009 must be pressed out and together with its collar fitted into the recess of the pressure disc Sta 3129 of the new ratchet cylinder mechanism. If the socket collar should fit too tightly, then it will have to be polished.
- 2) If it is ascertained that the roller has a stop on this side, after the new ratchet cylinder mechanism has been built in, then the ratchet mechanism must be shifted by 180° .

Illustration 3



take up the washer 5596-98
by this first collar, then

3006

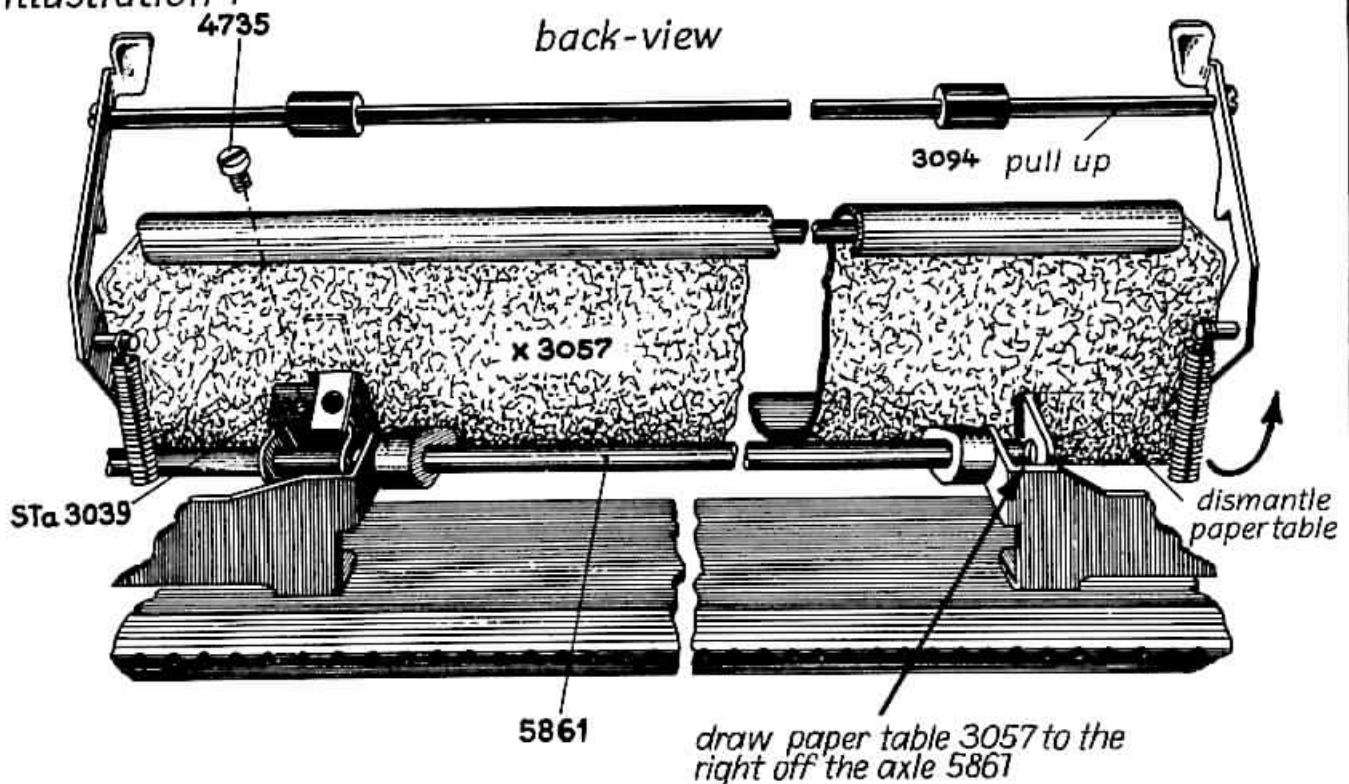
see to it that the second collar
sets into the jaw of side cover
3006 before the screws 5129 are
screwed.

Necessary tools

2 screw drivers short 5 x 0,6 RW 81

A. Removing

- 1) Remove platen in accordance with instructions for overhaul No. 1/3.
- 2) Raise slide guide SStw 3025 with paper holder.
- 3) Remove screw 4735 (see following illustration 1)

Illustration 1

- 4) Raise paper bail SStw 3094
- 5) Push paper guide pan SStw 3057 to the left, so that it comes out of the bearing at the back on the right of shaft 5861.
- 6) Take paper guide pan out in front; Care must be taken, that if possible the front feed roll does not fall out. If the front feed roll SSta 3035 should fall out, care must be taken that the adjusting rings next to the outer feed roll are seated on the correct side.

B. Replacing

- 1) The paper release lever SStw 3121 is laid to the front.
- 2) Paper guide pan SStw 3057 is pushed with the bearing point on to the back left side of shaft 5861 and then pressed parallel with both hands against leaf spring Sta 3044 until one is able to release scale rail Sta 3037. This is put into working position and the paper guide pan finally brought into the correct position.

REMOVING AND REPLACING OF PAPER FEED PAN

Group: Carriage

- 3) When inserting screw 4735 it is necessary to press against bearing bridge Sta 3039 with the second screw driver, as otherwise it will be impossible to insert it perpendicularly into the thread hole.

It is advisable that the paper guide pan is only taken out of the platen after dismantling. Any other removing i.e., replacing method might lead to the bearing and paper holder being bent and straightening might involve unnecessary waste of time.

Necessary tools

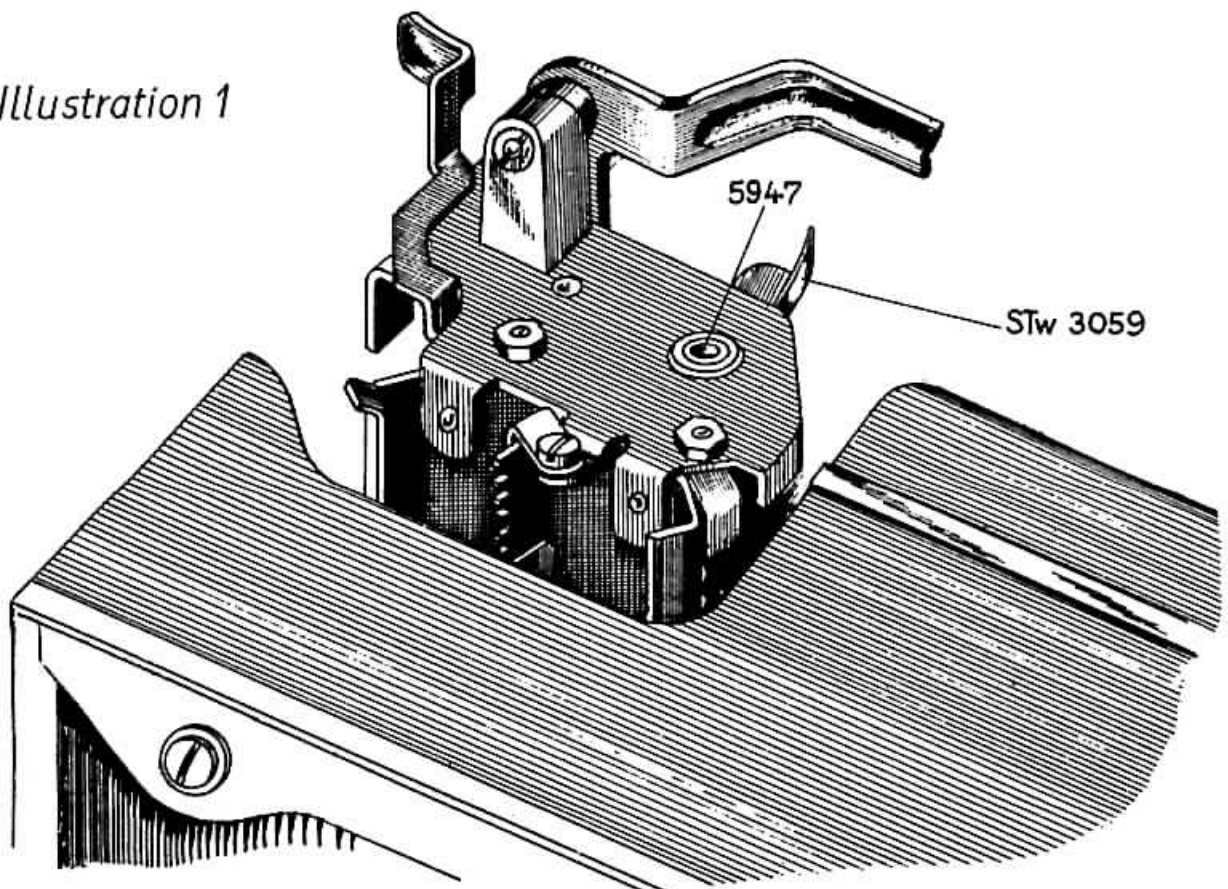
- 1 watchmaker's screw driver.
- 1 screw driver 6 x 0,6 RW 81
- 1 screw driver 8 x 0,8 RW 82
- 1 slit screw driver 4 M 3
- 1 spring hook
- 1 round pliers - Langbeck
- 1 box spanner
- 1 hammer 100 gr.

A. Removing

- 1) Remove platen according to instructions for overhaul 1/3.
- 2) Remove paper guide pan according to instructions for overhaul 1/5.
- 3) Take machine on lap edgewise and with mandrel take carefully bush 5947 out of the left carriage side wall. (see illustration 1)
- 4) Pull line space lever Stw 3059 from socket 5500.
- 5) Remove dual function spring 5669 from tie rod Sta 3053.
- 6) Pull off tie rod with angular lever and pawl SSta 3058 from bearing bush 5500 and by means of unscrewing of screw 4613 loosen from line space lever SStw 3052.

B. Replacing

Replacing of line spacer is carried out in reverse order.

Illustration 1

Necessary tools:

- 1 screw driver 5 x 0,4 short
- 1 screw driver 6 x 0,6
- 1 drawing pin

A. Removing

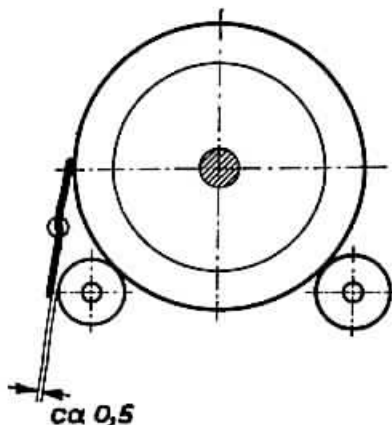
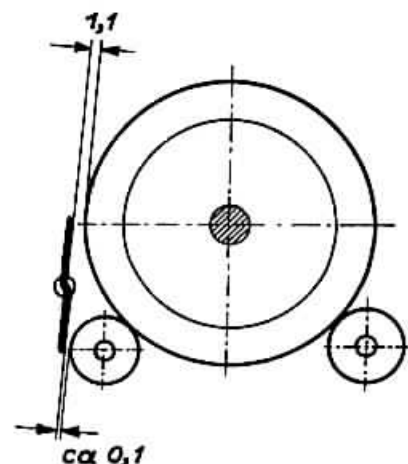
- 1) Remove carriage according to IO No. 1/2.
- 2) With the drawing pin mark the seat of the four screw heads 4628 on the inside of the carriage mounting plate. (hereby the position of the alignment guide can be quickly found).
- 3) Loosen the four fixing screws 4628.

Now the alignment guide or damage part of the alignment guide bearing can be exchanged.

B. Replacing

Replacement takes place in reverse order. Care should be taken that the alignment guide is correctly adjusted to the platen and front feed roll. The measurements given in illustration 2 must not be exceeded, as otherwise, there is danger that the lower edge of the alignment guide brushes against the line height indicator and the movement of the carriage is thereby partly impeded.

After replacing and adjusting the alignment guide it should be examined in order to make sure that the lower and upper longitudinal edges are straight and if necessary adjust them by hand. The alignment guide must fit above the entire upper longitudinal edge on to the platen and must be slightly sprung (see illustration 1).

Illustration 1*Illustration 2*

REMOVING AND REPLACING OF LINE SPACE LEVER

Group: Carriage

Necessary tools:

- 1 screw driver for lock nut
- 1 screw driver 5 x 0,4
- 1 screw driver 8 x 0,8 short
- 1 spring driver
- 1 socket wrench

A. Removing

- 1) The carriage can remain on the machine.
- 2) Loosen and remove screw 4613 under the short arm of the line space lever.
- 3) Loosen lock nut 5236 from dual retaining screw 4049 and remove.
- 4) Remove dual retaining screw 4049.

The line space lever can now be exchanged.

B. Replacing

When fitting a new line space lever it is not advisable that the old screw 4049 is used again but a new one should always be used which must be specially adjusted. Replacing itself takes place in reverse order to removing.

Before fitting in screw 4049 it must be slightly oiled, as it is ground with a circular movement and polished. When replacing screw 4613, as shown on illustration 1, the line space pawl 3041 should be pressed downwards with a socket wrench, thereby tie rod Sta 3053 swivels towards the short arm of the line space lever and screw 4613 can be easily and quickly inserted. Care should thereby be taken that - as shown on illustration 2 - the short shoulder of screw 4613 is not seated on the eye of tension rod Sta 3053.

After replacement has been completed it is necessary to examine whether the line space lever is fixed so that it moves freely and no noticeable play can be ascertained. When moving line space lever at the end no movement must be felt.

Illustration 1

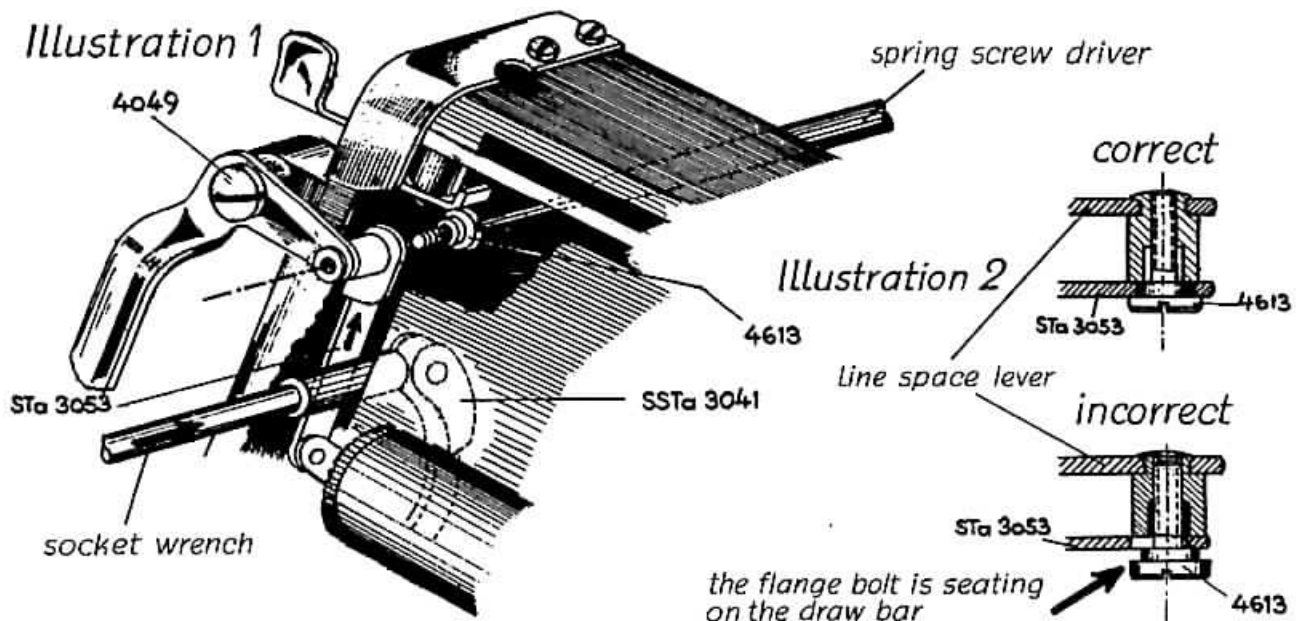
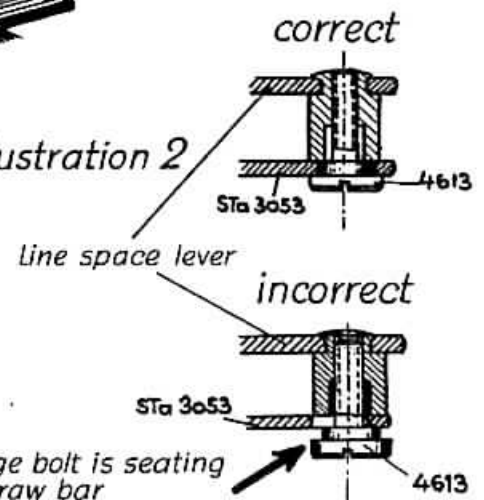


Illustration 2



EXCHANGE OF LINE SPACE LEVER (NEW EXPLANATION)Necessary tools:

1 screw driver	RW 81	short	8 x 0,8
1 screw driver	RW 81	short	5 x 0,4
1 spring screw driver	RW 85		
1 spring hook	RW 88		

A. Removing

Carriage can remain on the machine.

- 1) Unhinge dual function spring w 5659 on tension rod STw 3053.
- 2) Loosen screw 5096 on short arm of line space lever from below.
- 3) Loosen collar nut 5615 from bearing nut w 4049.
- 4) Remove dual retaining screw w 4049.

When exchanging an old line space lever for a new one it is also necessary to exchange the line space pawl complete with tension rod and angle as well as the new tension spring w 5659. When replacing a new space lever the fitted screw delivered by the works is to be used.

B. Replacing

Replacing takes place in reverse order according to IO No. 1/8 (old explanation).

Necessary tools:

- 1 screw driver 6 x 0,5 long
- 1 spring hook
- 1 spring screw driver

A. Removing

- 1) Unhinge tension springs 5659 which are on both levers SSTw 3087 and SSTw 3121 and let them hang down.
- 2) Loosen retaining screws 4815 on levers SSTw 3087 and SSTw 3121 paper bail can now be exchanged.

B. Replacing

Replacing occurs in reverse order. Care should be taken to see that the paper bail is parallel to the platen and the rollers must have a distance of 0,2 mm from the platen. The paper bail does not therefore lie on the platen in the working position. Furthermore it will be necessary to examine whether the alignment guide coincides with the start of the line. After complete adjustment the paper bail must have a slight fall and be removable with the paper detent lever SSTw 3122. Only then the two tension springs 5659 on levers SSTw 3087 and SSTw 3121 are replaced.
(Please note following illustrations 1-3 on this and next page).

Illustration 1

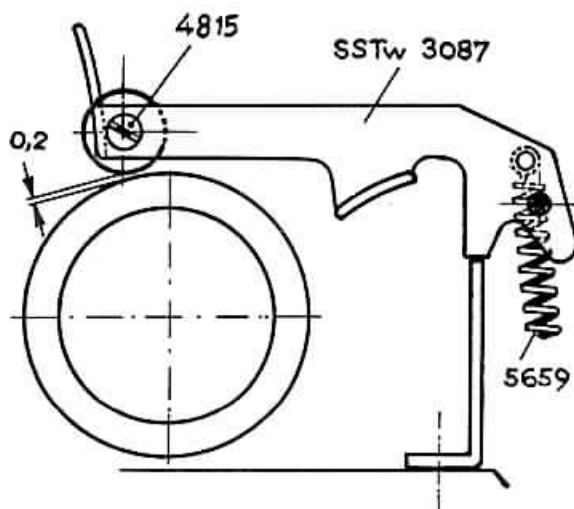


Illustration 2

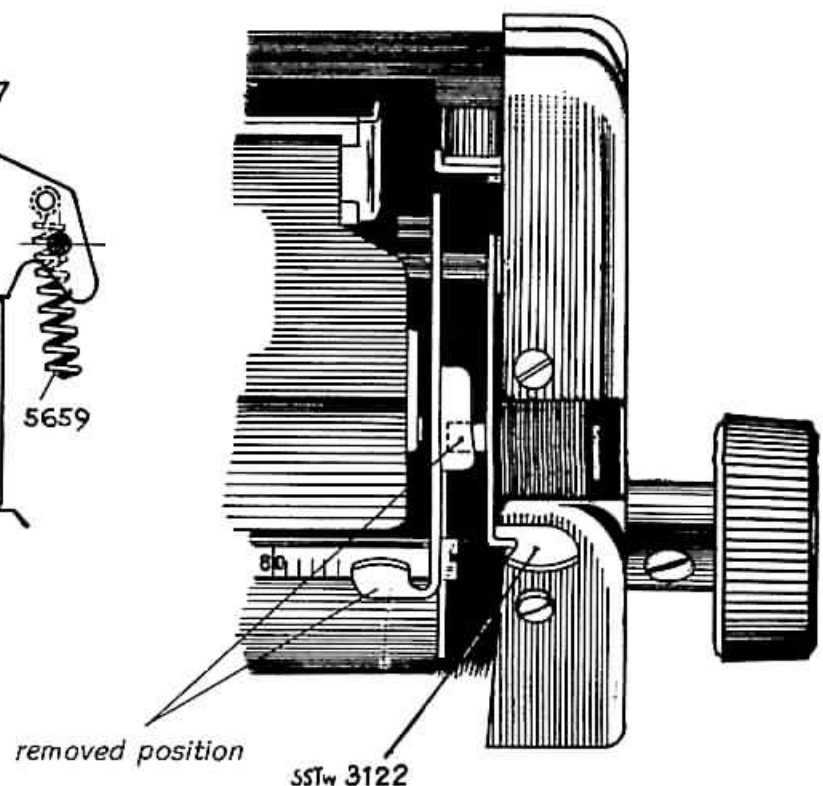
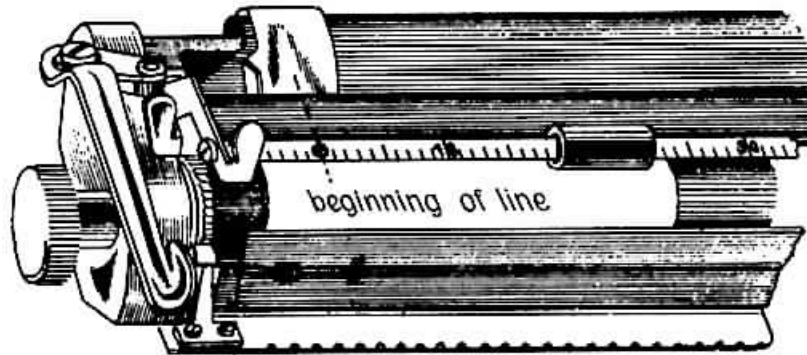


Illustration 3



REMOVING AND REPLACING OF LINE SPACE SPRING

Group: Carriage

Necessary tools:

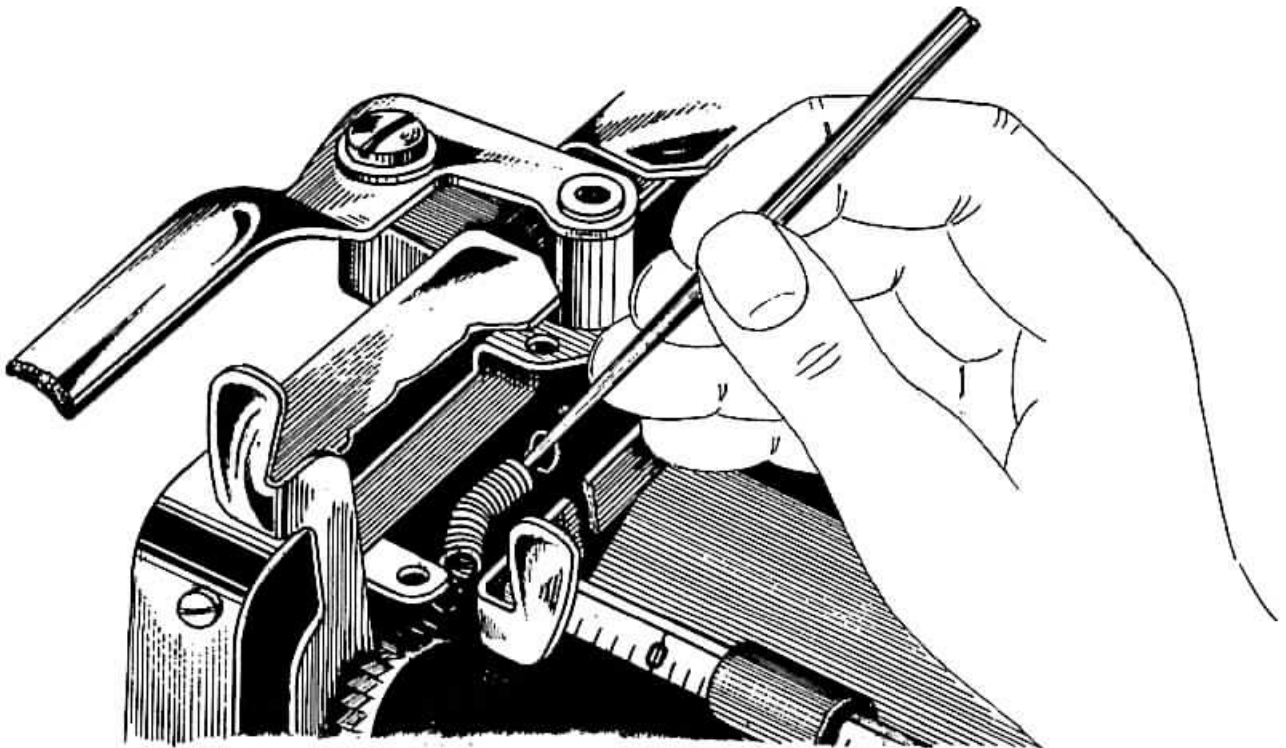
1 spring hook

A. Removing

Necessity for exchange of line space lever generally speaking will be breaking of the spring, so that only the remaining pieces of spring will have to be removed from the eyelets.

B. Replacing

The new spring 5669 is placed on the spring hook - as shown on the following illustration - and is reseated from below into the eyelets of the front reseating position of the lever stop 3061. Now the spring hook is turned so that it can be pulled again and the spring at the back is replaced into the eyelet of tension rod Sta 3053.



EXCHANGE OF LINE SPACE SPRING (NEW METHOD)Necessary tools:

1 spring hook RW 88

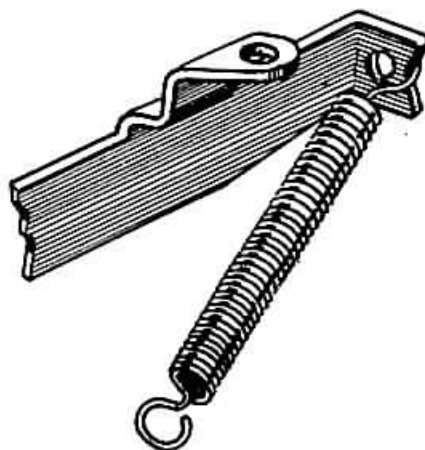
A. Removing

Exchange is to be made because spring is broken.
The remaining pieces are removed.

A. Replacing

The new spring w 5669 is placed on a spring hook and is hooked below into the front hooking position, the other spring eyelet in to the tension rod STW 3053, in such manner that the eyelet bits into the slot of the end of the flap (see illustration 1).

Illustration 1



**REMOVING AND REPLACING OF PAPER FEED
(FRONT AND REAR FEED ROLL)****Group: Carriage**Necessary tools:

- 1 screw driver 6 x 0,5 long
- 1 watchmakers screw driver
- 1 hammer 100 gr.
- 1 nut socket wrench S = 5
- 1 pincer (Schnabel Zange)

A. Removing

- 1) Remove carriage from machine (see IA 1/2)
- 2) Remove platen (see IA 1/3)
- 3) Remove paper pan (see IA 1/5)
- 4) Remove front feed roll SSta 3035.
- 5) Unscrew flat spring Sta 3044 from carriage main plate.
- 6) Take one side of paper feed bearing apart as follows:-
 - a) loosen adjusting ring 5527 and push in the direction of the centre of shaft.
 - b) Loosen torsion spring bearing (lock-nut 5209 and retaining screw 4611)
 - c) Push lever Sta 3018 in the direction of the middle of shaft when removing right bearing i.e. lever Sta 3020 when removing left bearing
 - d) Remove torsion spring 5753 i.e. 5752 with retaining screw 4611.
 - e) Push back shaft 5882 until the pressure lever Sta 3017 becomes free on the left or right.

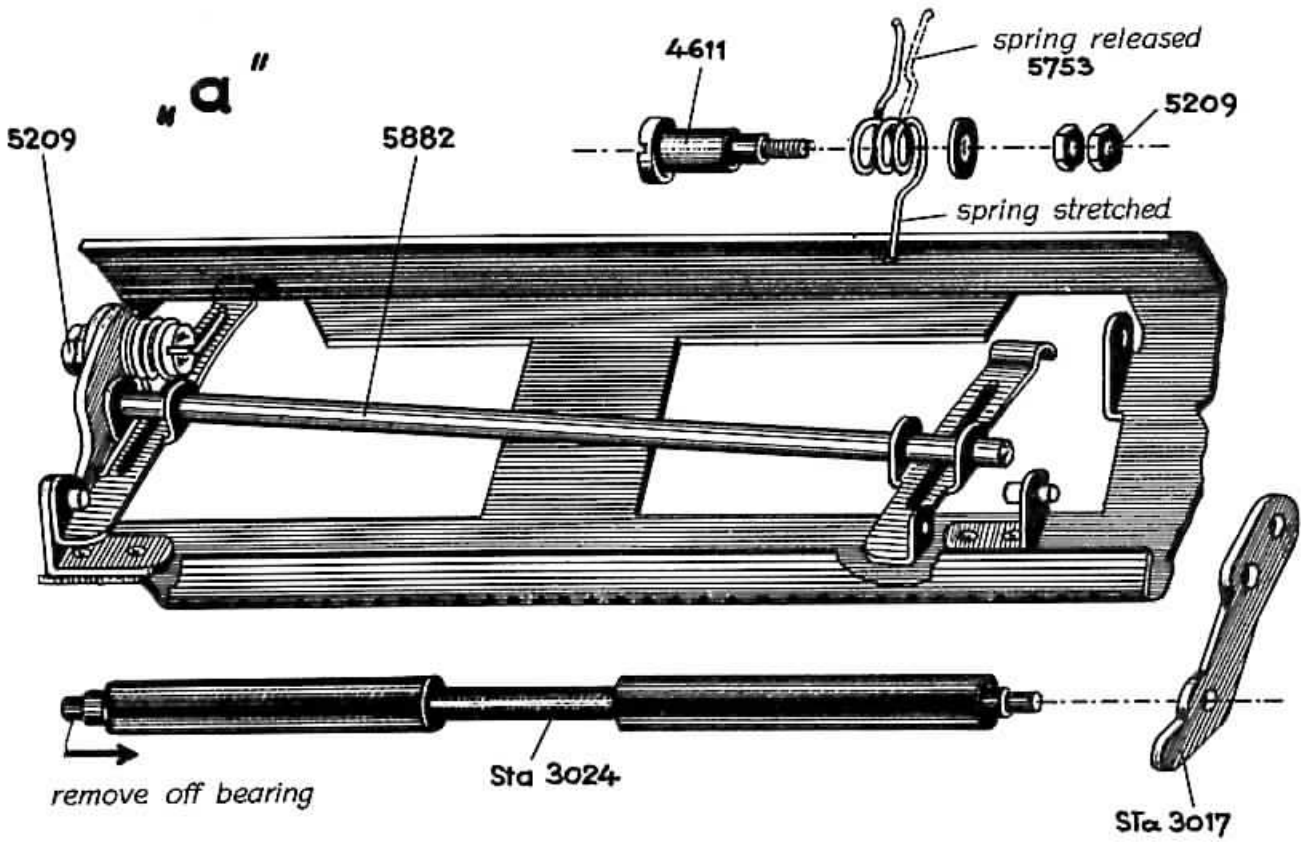
The back feed roll SSta 3024 can now be taken out. It is not advisable to take both bearing points of the back feed roll apart, as thereby replacing i.e. assembling may be made more difficult.

B. Replacing

Replacing takes place in reverse order. Here also we would strongly advise that the instructions for overhaul 1/2, 1/3 and 1/5 be followed. After assembling of the paper feed, tests should be made by moving the paper release lever SStw 3122, whether all parts of the paper feed have uniform play and the back feed roll moves easily in the bearing. The bearing points of the feed rolls must be carefully greased, as well as the reception points of the torsion spring endings. After replacing of the platen the pressure of the front and back feed rolls must be tested. Subsequently the carriage is set on to the machine and the paper guide is tested with the line spacer. It is important to make sure that the paper pan is correctly fitted. The windows for the feed rolls must be parallel to these and the feed rolls themselves must lie in the centre of the windows.

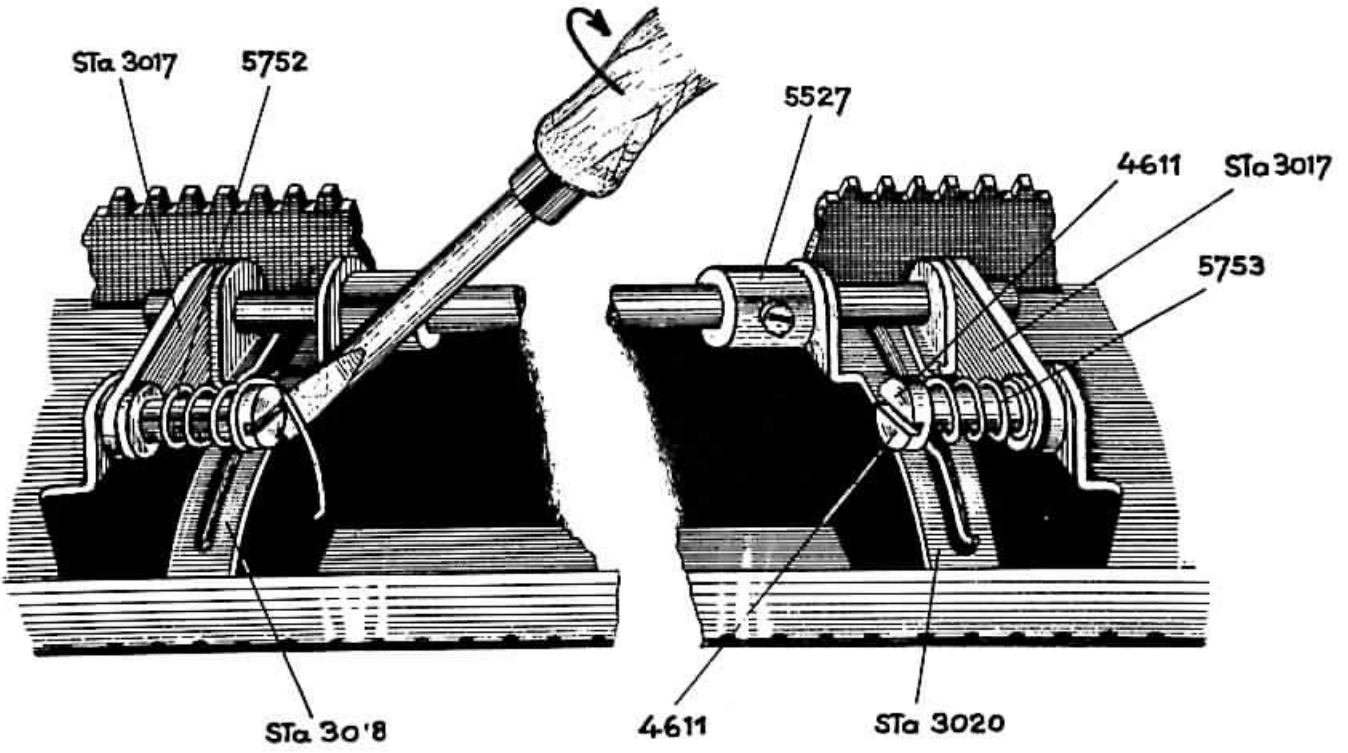
For further explanation refer to the illustration on page 2, which represent:-

- a) The final position after dismantling of a bearing side of the back feed roll, seen from the underside of the carriage.
- b) The correct position of the torsion springs on the levers Sta 3018 and Sta 3020.
- c) Replacing of the ends of torsion springs 5753 and 5752 into the bearing points.



"b,c"

putting in of the torsion spring



Necessary tools:

- 1 screw driver 6 x 0,5 short
- 1 spring screw driver
- 1 pincette
- 1 pincer (Schnabel Zange)
- 1 piercer 2 mm

A. Removing

- 1) Remove carriage from machine (see IA 1/2)
If the changing of one of the two margin stop dogs is the reason for dismantling, then only side of the margin stop-rack fastenings is loosened. But if an exchange of the margin stop-racks itself is necessary, then both fastenings have to be loosened, whereby the adjustment for the margin lock is lost. In order to facilitate re-assembling as much as possible, it is advisable, to make a mark on the rack and the back of the carriage (which does not have to be loosened) before taking apart, as appears from illustration 1. This marking can be accurately transferred on to the new margin stop-rack, whereby it can then be very quickly fitted in the correct side position. In this way the beginning of the line, the end of the line, the space bar and the correct functioning together with the switch lock are then found without loss of time.
- 2) Screw 4641, distance bushing 5885, discs 5569 and the counter nuts 3120, have to be loosened and removed on both sides, the rack now falls through to the bottom. Now the margin stop-dog or the margin stop-rack can be changed.
- 3) The marking on the old rack is now transferred to the new rack.

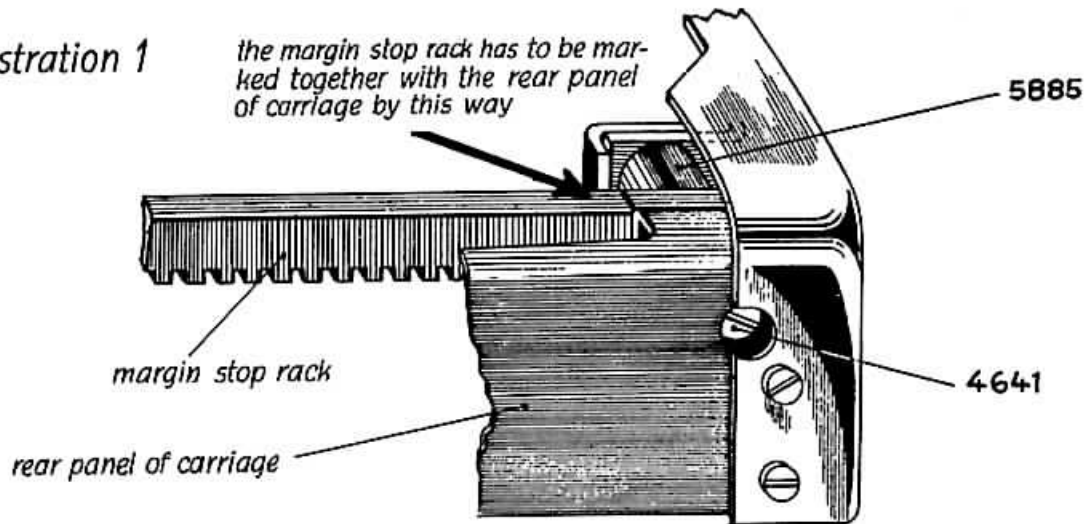
B. Replacing

Replacing can only take place from the bottom, as shown on illustration 2. Rack and distance bushing are fitted together with the piercer brought to the centre of the drilling. The washer is inserted by means of the pincette and the screw with the spring driver. Subsequently the counter nut is held under it and one side fitted loosely. Then the parts are inserted on the other side. The rack is shifted sideways, until the markings coincide. Then the rack is pressed downwards, in order to produce the parallel position by removing of the play to the screw on both sides. Both screws must be tightened firmly. The carriage can be put back on the machine and commencement of line, end of line, margin stop etc., tested. (Please take note of IA, 3/1, setting of margin stop)

back-view of left carriage side

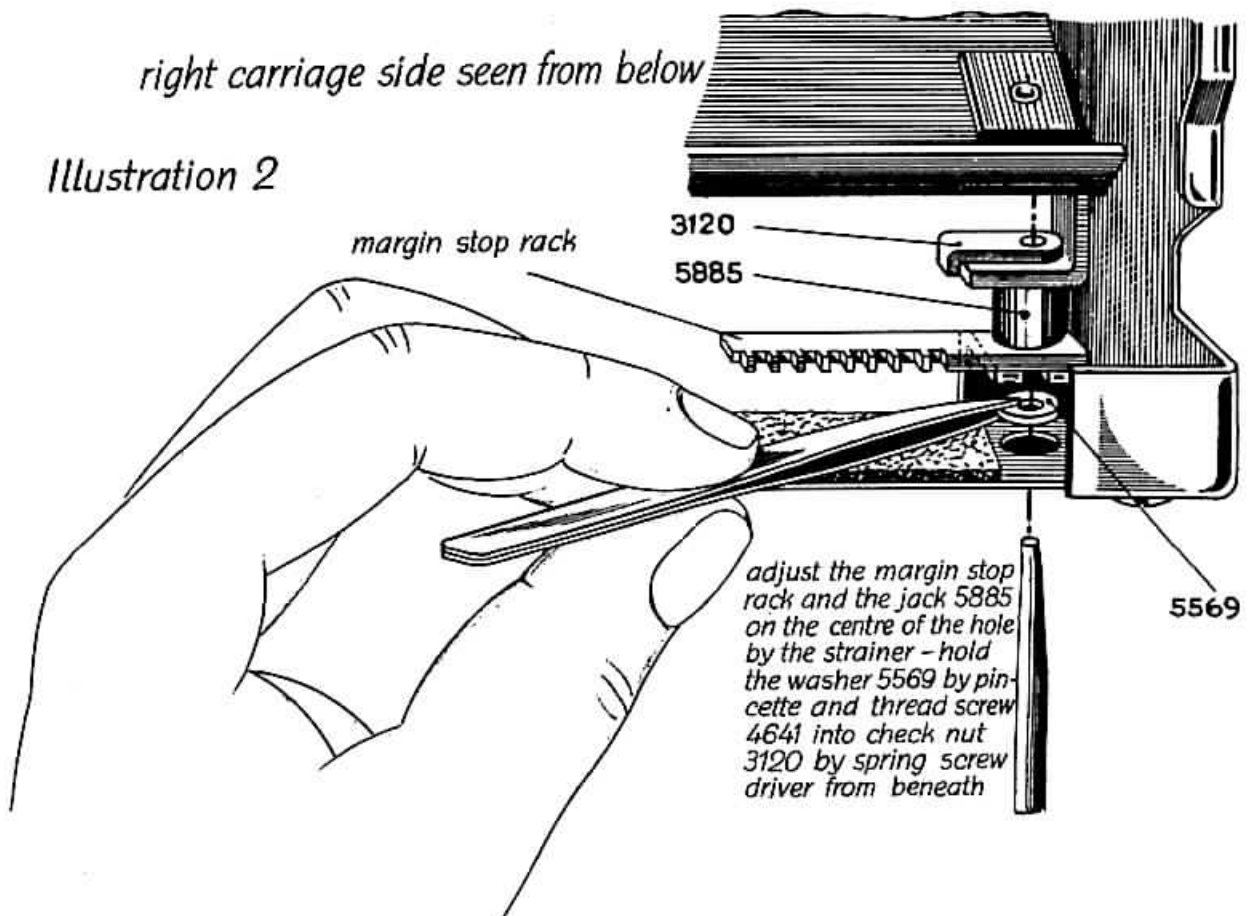
Illustration 1

the margin stop rack has to be marked together with the rear panel of carriage by this way



right carriage side seen from below

Illustration 2



**REMOVING AND REPLACING OF LEFT OR RIGHT
SHIFT KEY LEVER****Group: Frame**Necessary tools:

- 1 screw driver (long) 3 x 0,4
- 1 angle screw driver
- 1 spring hook
- 1 pincette
- 1 drawing iron

A. Removing

It is not necessary to take the machine out of the covering.

- 1) Loosen bearing screw 4707 with angle screw driver. Thereby key levers 1 and 2 are pressed down.
- 2) Unhook tension spring 5665 out of the intermediate lever bearing.
- 3) Pull shift key lever upwards and out.

B. Replacing

Replacing is carried out in reverse order. Care should be taken that the key lever only commences to be depressed at a depth of 0,5 to 1mm. The roll carrying end of the shift key levers must if necessary be adjusted behind the turning point of bearing screw 4707 by means of a special drawing iron.

On the left shift key lever after adjustment of the previously described play the shift lock may have to be adjusted, so that on excess pressure being exerted on the shift key, the shift lock is automatically released.

Necessary tools:

- 1 angle screw driver
- 1 screw driver (short) 6 x 0,6
- 1 watchmaker's screw driver
- 1 double lever key
- 1 pincette
- 1 coupling iron (strong)
- 1 coupling iron (weak)
- 1 hook spanner RW 22
- 1 hook spanner RW 23

A. Removing

- 1) Remove carriage in accordance with Instructions for Overhaul No. 1/2.
- 2) Remove Machine out of covering in accordance with instructions for Overhaul 1/1.
- 3) Unscrew bearing angles on the U. Bar SStA 1022 for ribbon feed Sta 1023 and Sta 1023a (2 screws No. 4843 each)
- 4) Unscrew oscillator Sta 1019 (3 screws No. 4843)
- 5) Loosen left bearing position of U Bar SStA 1022 (nuts 5273 and "Form" screw 4220)
- 6) Take U Bar out through windows in the frame side wall

B. Replacing

Replacement takes place in reverse order, but attention must be paid to the following:

- 1) The side play of the Universal Bar between the set screws is 0,2 mm.
- 2) As soon as the bearing angles (Lagerwinkel) Sta 1023 and Sta 1023a as well as the oscillator Sta 1019 are screwed back, the following functions of the typewriter must be tested:

a) Shift Release

The shift release, measured on the type in front of the platen, should be 4 mm, whereby the test is made by 2 of the outer levers lying opposite each other and the type bar centre. As soon as this test shows an uneven shift release, the appropriate adjustment of the bearing arms of the oscillator must follow.

b) Ribbon Feed

The bearing angles Sta 1023 and Sta 1023a for draw band Sta 1282 (on both sides) are set straight and tested whether the draw bands have sufficient play on all sides.

Furthermore the distance of pawls Sta 1324 and Sta 1306 to ratchets Sta 1315 and Sta 1297 on the ribbon reverse at the end of the type bar lever movement has to be tested. Un-evenness has to be adjusted by elongating or shortening of draw bands Sta 1282 with the coupling iron (Kuppeleisen).

REMOVING AND REPLACING TYPE BAR GUIDE**Group:** FrameNecessary tools:

- 2 screw drivers (short) 6 x 0,6
- 1 copper pin 6 mm Ø or similar
- 1 hammer 50 gr.

A. Removing

It is not necessary to take the machine out of the casing.

- 1) Remove Cover "Blende" STw 1333 (4 screws 4628).
- 2) Remove fastening screws 4735 for the type bar guide.
- 3) With 2 screws drivers grip at the same time behind type bar and loosen them slightly out of the segment.
- 4) Set ribbon control lever to red position.
In this position pull type bar guide STw 1274 downwards out of the ribbon fork.

B. Replacement

Replacement takes place in reverse order. After this has been completed, the following test should be made.

- 1) The capital letters A and Ä are tested alternatively.
- 2) If they are out of agreement when raised, then the type bar guide should be tapped with a copper pin or similar soft object slightly to the left or to the right, depending on whether the letters are shifted to the left or to the right. If the right letter Ä is too high (in comparison with the capital letter A), then the type bar guide must be shifted a little to the left. The copper holt must be applied sideways, and under no circumstances on one of the two guide flaps.

REMOVING AND REPLACING OF LEVER AND PAWL OF
BACK SPACER SHIFT

Group: Frame

Necessary tools:

- 1 angle screw driver
- 2 spring hooks
- 1 pincette
- 1 spring screw driver
- 1 screw driver (long) 3 x 0,4.

A. Removing

It is not necessary to take the machine out of the casing, only the back has to be taken away.

- 1) Remove carriage in accordance with repair instructions 1/2.
- 2) Remove back part of casing.
- 3) Unhook draw spring 5679 from screw 5038 and let it drop.
- 4) Unscrew screw 5038 out of back pawl SSTa 1441 and allow draw-band STa 1127 to fall freely.
- 5) Remove escapement in accordance with instructions for overhaul No. 1/24.
- 6) Loosen screw 4636 and disc 5305 on shift lever STa 1081 with angle screw driver, and remove.
- 7) Unhook torsion spring 5804 on both sides.
- 8) Pull off shift lever STa 1081 with torsion spring 5804 from bearing-pin 4244.

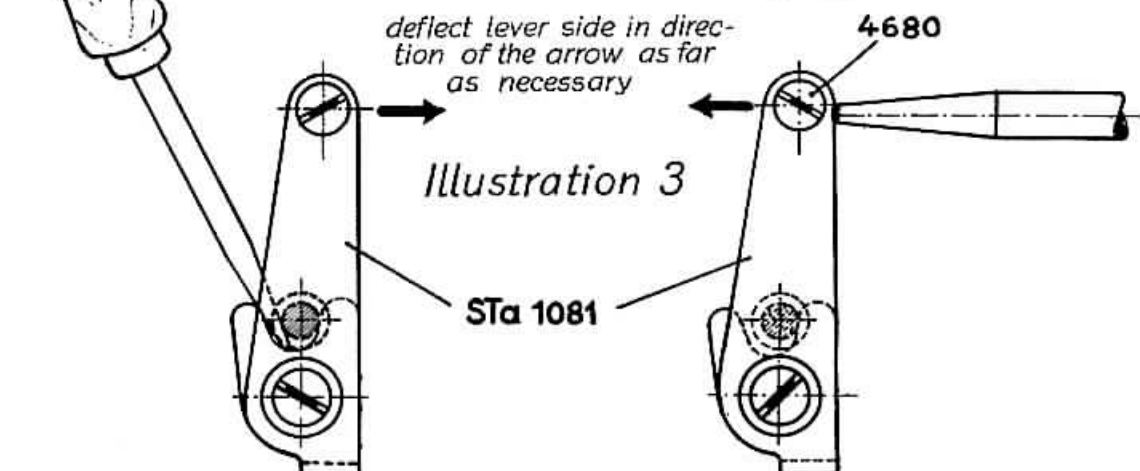
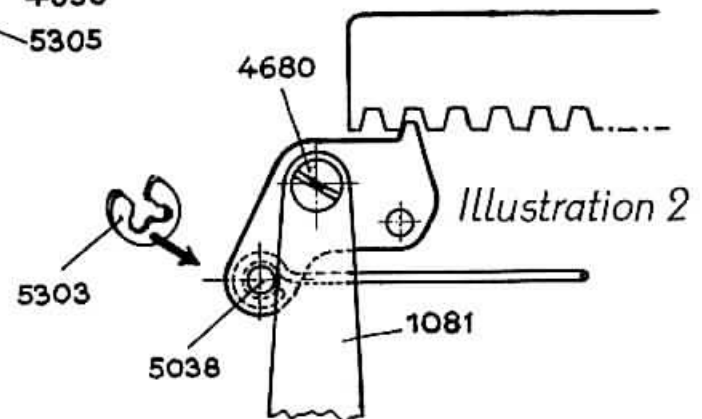
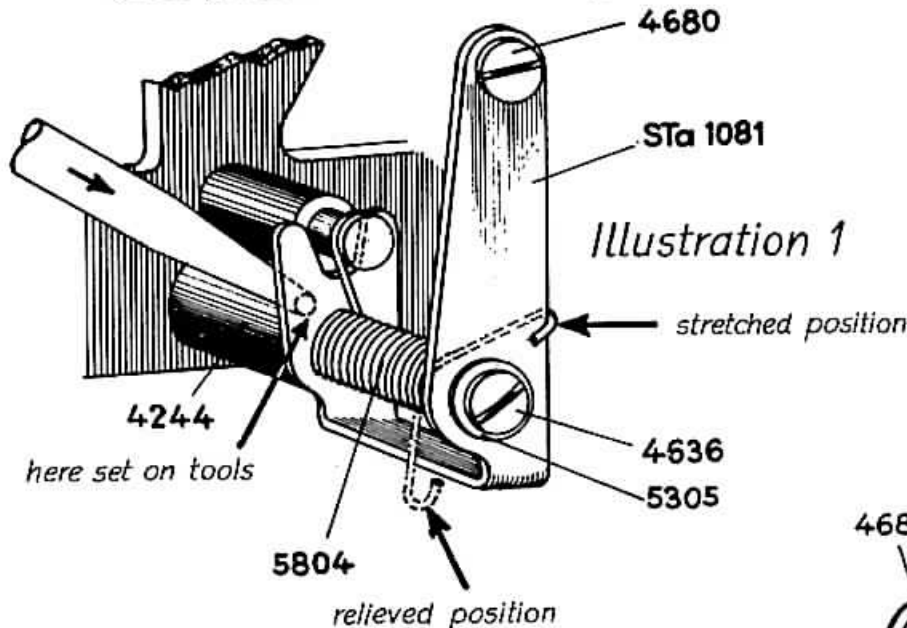
B. Replacing

- 1) Push shift-lever STa 1081 with torsion spring 5804 on to bearing-pin 4244 (position of torsion spring in lever before tension can be seen on Illustr. 1.)
- 2) Screw back screw 4636 with disc 5304 and tighten. Thereby the change-over of the lower position must be engaged.
- 3) Adjust shift lever (Illustr. 1 shows the commencement of the stop on the lower side of the shift lever).
- 4) Tighten torsion spring 5804. The short hook end of the torsion spring is pulled through at the bottom through the shift lever, and is hooked on to the surface side with two spring hooks.
- 5) Replace escapement lock.
- 6) Set draw-band STa 1127 on screw 5038 and screw this in to back space-lever SSTa 1441.
- 7) Hook back torsion spring 5670.
- 8) Replace carriage and adjust back spacer. In this connection, the following precautions are necessary:-
 - a) The carriage should be pushed to the right to the extreme end of the stop. When the carriage is in this position, the back spacer pawl must, when the back spacer is moved, grip into the second tooth space of the rack of the carriage in such a manner that it glides along the left tooth profile (see Illustr. 2.) This applies to machines having a 2,6 mm. division. If the division is 2,3 mm. the pawl must grip into the third tooth space of the rack in the same manner. If this condition is not carried out, the shift lever is twisted within itself from the long to the short part (see Illustr. 3.)

REMOVING AND REPLACING OF LEVER AND PAWL
OF BACK SPACER SHIFT

Group: Frame

- b) Now the distance from dog-pin 4823 in tension lever SSTa 1070 to pressure-lever SSTa 1072 must be noted. The distance should be 0,3 mm. If it is too long or too short, then the length of rack STa 1127 is altered accordingly through the "form" piece 5078. (For this purpose, counter-nut 5214 has to be loosened.) This distance is to be tested in both switch positions.
- c) When back-spacer is depressed, tap lightly with the flat of the hand against the platen knob. The carriage must be firmly seated: it must not be possible to push out the space-bar pawl by reason of the rack tension occasioned by the tap.
- d) When back-spacer is depressed, test whether the carriage has free play to the right (approximately 0,2 mm.).
- e) If the back-spacer is moved quickly, the switching movement must not enable the carriage to slide so that it is switched back two spaces. This test should also be carried out in both positions of shifting.



REMOVING AND REPLACING OF RIBBON FORK**Group:** FrameNecessary tools:

- 1 screw driver (short) 6 x 0,8
- 1 copper pin (3 mm. Ø)
- 1 spring hook
- 1 pincette

A. Removing:

This work does not require the machine to be taken out of the casing, nor the carriage to be removed from the machine.

- 1) Unscrew cover (Abdeckblende) STw 1333 from segment (four screws 4628).
- 2) Unloosen segment fitting screw 4687 and remove.
- 3) Loosen segment from pin and move it, at the most, 1cm. from the surface on the double bearing bridge. The ribbon shift-lever is to be set at red as, in this position, the actuating lever STw 1148 is in the highest position.
- 5) Lift ribbon fork STw 1227 upwards out of the type bar guide STw 1274.
- 6) With the thin copper pin, bend a "safety flap" of the ribbon-fork, in order to clear the way for taking out bearing-pin 4014.
- 7) With the spring hook, pin 4014 is pushed out a little way and pulled out altogether with the pincette.

B. Replacing

Before a new ribbon fork is replaced, the "safety flap" has to be bent off. Otherwise, replacing takes place in reverse order. Care should thus be taken that

- 1) The tension of the guide flaps on the ribbon fork are, if necessary, adjusted in such a manner that the fork drops easily and does not have too much free play at the back,
- 2) The ribbon fork must not, at the back, touch the line-finder frame. Therefore care should be taken that it is not bent when replacing.

**REMOVING AND REPLACING OF RIBBON U-BAR 1210
FOR LIFTING RIBBON****Group:** FrameNecessary tools:

- 1 screw driver 6 x 0,8
- 1 spring screw driver
- 1 spring hook
- 1 pincette

A. Removing

- 1) Remove carriage according to "Instructions for Overhaul" 1/2.
- 2) Remove machine from casing according to "Instructions for Overhaul" 1/1.
- 3) Unhook tension-spring 5652 out of U-Bar. Thereby set colour zone control lever to "Stencil".
- 4) Loosen bearing screws 4843 on both sides.
- 5) The U-Bar can now be lifted out upwards.

B. Replacing

Replacing takes place in reverse order. Care will have to be taken that the double shoulder nut 4359 on the rack SSR2 1212 fits easily into the curve of the arm of the U-Bar on the right hand side.

Necessary tools:

- 1 spanner
- 1 spring hook
- 1 pincette

A. Removing

The Machine remains in the casing.

- 1) Remove carriage according to "Instructions for Overhaul" 1/2.
- 2) Unhook torsion spring for shift 5725 on the side of the spring drum.
- 3) Loosen counter-nut of spring drum shaft 5287 (left winding) and lift off top with disc 5391.

B. Replacing

When replacing spring drum, the drawband has to be completely wound up; the spring drum with the hooking eyelet is inserted upwards and screwed tight in this position. Consequently, the spring casing, together with wound-up draw band, is tightened by one turn: the hooking eyelet of the draw band is held and hooked temporarily on to the pivot suspension of the revering side panel. This corresponds to the tension of the spring balance when in motion

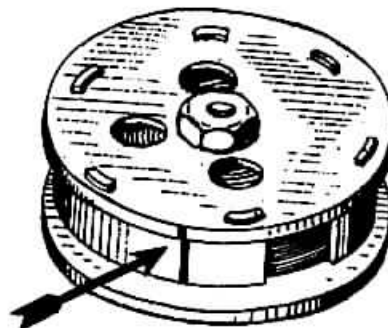
Necessary tools:

- 1 jaw wrench S = 8
- 1 chisel 3 x 1,3 (ground narrow and blunt)
- 1 hammer 100 gr.
- 1 pointed pliers
- 1 screw driver 4 x 0,4 (short)

A. Removing

The machine can remain in its casing, only the back of casing has to be removed.

- 1) Remove carriage in accordance with Instructions for Overhaul 1/2.
- 2) Remove main spring drum in accordance with Instructions for Overhaul 1/2.
- 3) Unscrew nut 5287 from shaft SSTa 1105 (left thread)
- 4) Mark the lid of the spring drum with a pin before taking apart (see illustration 1)

Illustration 1

make marks here

- 5) The spring drum is then placed into a vice (it is advisable to use a support with cheeks according to illustration 2) and to push the 6 pivots through cover STa 1226 with a blunt chisel. Remove spring drum again out of vice.
- 6) With the pointed pliers unbend the inside of spring and unhook out of the spring hook. Now shaft SSTa 1105 and fixing plate can be lifted out with drawband. If the drawband is torn, it can now be exchanged and re-assembling can take place immediately. If however, it should be necessary to exchange the spiral spring STa 1099, then the old spring is removed with the help of a screw driver and must run down.

B. Replacement

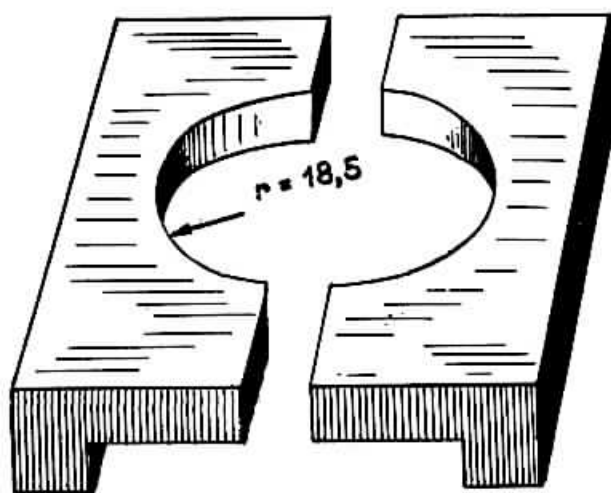
- 1) Remove the binding wire from the new spring and let the spring carefully unwind in the hand.
- 2) Hook new spring with the hook end into form rivet of base plate.
- 3) Pull spiral spring one motion into spring drum.

REMOVING AND REPLACING SPIRAL SPRING OR
DRAW BAND IN MAIN SPRING DRUM

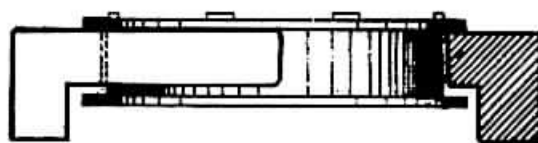
Group: Frame

- 4) Insert holding clamp with drawband SSTa 1102 in such manner, that it is seated with the inside flap on the first winding of spiral spring.
- 5) Wind spring completely into spring drum.
- 6) Insert spring drum shaft and press the first inside coil of spring firmly on to shaft.
- 7) Grease the spring with non-sticking Vaseline.
- 8) Replace cover of drum and seat the whole of the spring drum on a suitable piece of tubing, so that the pivots of the mounting plate are seated on the thickness of the tubing (observe markings).
- 9) Tap cover all round on the upper pivots, until proper seating is reached. Then the pivots are notched with flat chissel. (Always 2 pivots lying opposite each other are notched on the circumference).
- 10) Screw down nut 5287 (left thread). Fix spring drum shaft with aluminium cheeks into vice and tighten nut firmly.
- 11) Wind drawband four times around the spring drum in this tension and then pull out. By tightening and loosening the spring drum several times, it is possible to test whether the movement is light and as far reaching as possible.
- 12) The spring drum is then replaced into machine in accordance with instructions IA 1/19.

Illustration 2



*the spring housing must work
loose 1mm in the tightened jaws*



Necessary tools:

- 1 jaw wrench
- 1 spring hook
- 1 plier

A. Removing

The machine remains in its casing.

- 1) Remove carriage according to IA No. 1/2
- 2) Unhook reverse tension spring 5725a on the side of spring drum.
- 3) Loosen counter nut 5212 of spring drum screw 4722 and remove with disc 5391.
- 4) Remove spring drum screw and lift out spring drum. Insert new spring.

The former small spring drum cannot be exchanged against a new larger one, as the bearing slot has a different position in the rear carriage rail

If the spring drum is to be opened and a new spiral spring STw 1099 is to be inserted, we refer to IA No.1/20.

B. Replacing

The new spring drum can be inserted in any position, as it can be wound up.

- 1) Seat ratchet wheel STw 1833 and disc 5544 on to new spring drum (core)
- 2) Press crown STw 1836 on the other side.
- 3) Spring drum can now be replaced in reverse order and machine completed.

The core can be wound up on the spring drum with about 5 movements then the normal tension for the carriage is reached.

EXCHANGE OF SPIRAL SPRING OR TENSION CORD IN
NEW MAIN SPRING DRUM

Group: Frame

Cause: Spring or Tension Cord torn.

Necessary tools:

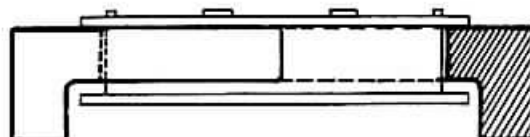
- 1 fixed spanner
- 1 narrow bluntly ground chisel 3 mm. x 1,3
- 1 hammer 100 gr.
- 1 short screw driver RW 81 5 x 0,4

A. Removing

Machine can remain in casing, only unscrew back.

- 1) Remove carriage according to IA No. 1/2
- 2) Remove main spring drum according to IA No. 1/19.
- 3) Unscrew nut 5212 on main spring drum shaft (right thread)
- 4) Unhook tension cord SSTw 1102. Remove spring drum.
When replacing a new tension cord, dismantling is completed. If the spiral spring is to be exchanged, the following precautions should be taken. (No. of spiral spring STw 1099)
- 5) Remove ratchet wheel STw 1833 and disc 5544 from spring core.
- 6) Lift off spring drum crown STw 1836 with screw driver.
- 7) Place spring drum into vice, thereby supporting it with cheeks as shown on illustration 1. With the blunt chisel tap the 6 pivots over the corner through lid. One can now get at spiral spring.
- 8) Lift out spring drum core STw 1837 with both washers 5544 upwards.

Illustration 1



the spring housing must have about 1mm play between the tightened jaws

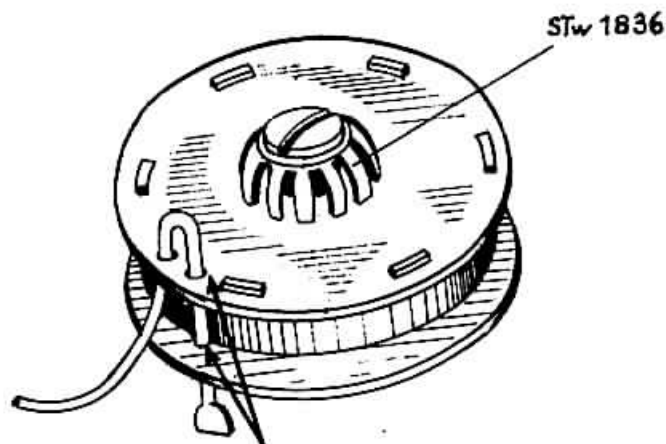
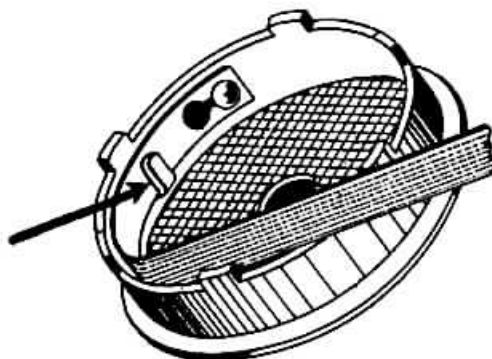
B. Re-assembling

- 1) Remove tie wire from new spring STw 1099 and carefully let spring unwind in the hand.
- 2) Hook new spring with hooking end into form rivet of the mounting plate.
- 3) Draw spiral spring completely into spring drum. Care should be taken that the first movement lies between the spring drum walls and the raised flap of the mounting plate (Illustration 2) The mounting plate of the spring drum has to be greased with non-sticky vaseline before the new spring is inserted.

- 4) At first insert disc 5545 into recess of mounting plate, then insert spring core and fix a second disc 5545 on it. If necessary, the first spring winding should be wound around the core with the pointed pliers.
- 5) Grease the tip of inserted spiral spring with vaseline.
- 6) Put on lid, care must here be taken that the holes for the tension cord cover each other in the lid and mounting plate. This makes marking before dismantling as previously suggested, unnecessary.
- 7) Rivet pivot with falt chisel, always two lying opposite each other consecutively. Test firm seating of lid.
- 8) Replace core STw 1836. Insert tension cord (illustration 3). The tension cord should not project more than 1 mm, after it has been pressed flat with flat pliers.
- 9) Replace spring drum and put machine together. The crown is wound up about five turns by means of a screw driver, then the normal tension has been obtained.

Illustration 2

the first turn has to be placed behind the hook



the holes must coincide with another

REMOVING AND REPLACING OF RATCHET LEVER SSTa
1350 (FOR RIBBON ACTUATING LEVER)

Group: Frame

Necessary tools:

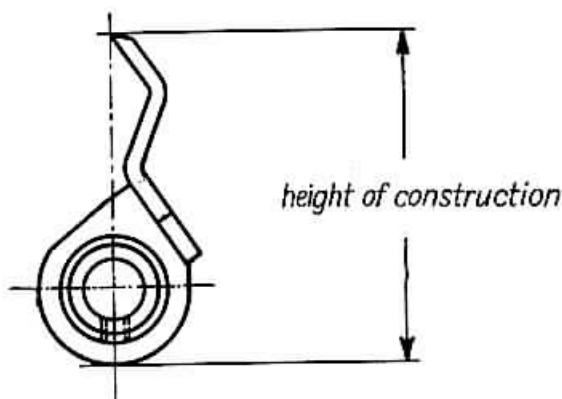
- 1 pair of flat pliers 8d Wz 42.
- 1 screw driver RW 81 6 x 0,8
- 1 watch makers screw driver 8d WSchr. 21

A. Removing

- 1) Remove carriage in accordance with I. for O. No. 1/2
(It is not necessary to remove machine out of casing)
- 2) Loosen threaded pin 4172 on set collar 5532.
- 3) Loosen screw 4668 on ratchet lever SSTa 1350.
- 4) Pull shaft 5921 by means of flat pliers outwards and
remove ratchet lever SSTa 1350.

Now this part can be exchanged for a new one. Care should be taken, that before replacing, the new ratchet lever is compared with the old one and that its height, as illustrated on illustration 1 is measured. The ribbon actuating arm is only accurate after insertion of new ratchet lever, if it has the same height as the old ratchet lever up to a fraction of 0,1 mm.

Illustration 1

B. Replacement

- 1) The new ratchet lever SSTa 1350 is seated on shaft and fixed through the bearing angle (reverse lever) STa 1151.
- 2) In this position the set collar 5532 is fixed so close in front of it to enable the shaft to have 0,2 mm. side play.

Ratchet lever SSTa 1350 must be properly adjusted and ribbon actuating lever must be tested.

REPLACING AND REMOVING OF ESCAPEMENT

Necessary tools:

- 1 screw driver 250 mm. long 8 x 0,6 RM 81
- 1 screw driver 250 mm. long 8 x 0,6 RM 81
- 1 spring hook
- 1 spring screw driver
- 1 pincette
- 1 steel pin 5 mm \emptyset , 150 mm. long
- 1 flat plier

A. Removing

- 1) Remove front cover 1970.
- 2) Unscrew front lower cover SStw 1956.
- 3) Remove carriage. For this purpose end screws 4829 in carriage mounting plate. SStw 3004 must be removed. It is important to note the angular position of the prismatic end of the seating of the screws. In order to remove the carriage this prismatic end must be bent straight.
- 4) Unhook draw band and hang up in change over position.
- 5) Run carriage to end, thereby pressing on margin release key and tap space bar several times in end position of carriage in order to bring carriage further than end stop Stw 1078 in reverse position.
- 6) Raise machine at rear. Loosen both rear frame connecting screws 5156 of casing. At the same time remove rubber discs 5310 and 5599. Do not remove the two front frame connecting screws, but only loosen by 2 turns.
- 7) Bring machine back into normal position and turn it so that its rear faces mechanic. Lift machine frame at the shift mechanism push steel pin through on the left over casing SStw 1430 and under the rear upper frame connection Stw 1430, until it comes to rest on buffer screw 5032. Now one must be able to move the shift mechanism easily up and down. In this position the machine frame is held in the casing and it is possible to remove the escapement.
- 8) Lifting of drawband and hanging over end stop. As to 7 and 8 see illustration on following page.
- 9) Loosen fixing screw 4602 for escapement for depressed shift mechanism.
- 10) Loosen form screw 5038 on back spacer pawl and unhook draw spring 5679 out of this screw. Let draw spring drop.
- 11) Depress back space tie rod Stw 1127 from escapement slightly and loosen escapement out of pin by moving it backwards and forwards to the front and take it out upwards. When depressing back space tie rod 1127 care must be taken, that it is not bent when depressing

Now the removed escapement can be examined for faults.

B. Replacing of Escapement

Replacing of escapement is carried out in reverse order but the following should be observed.

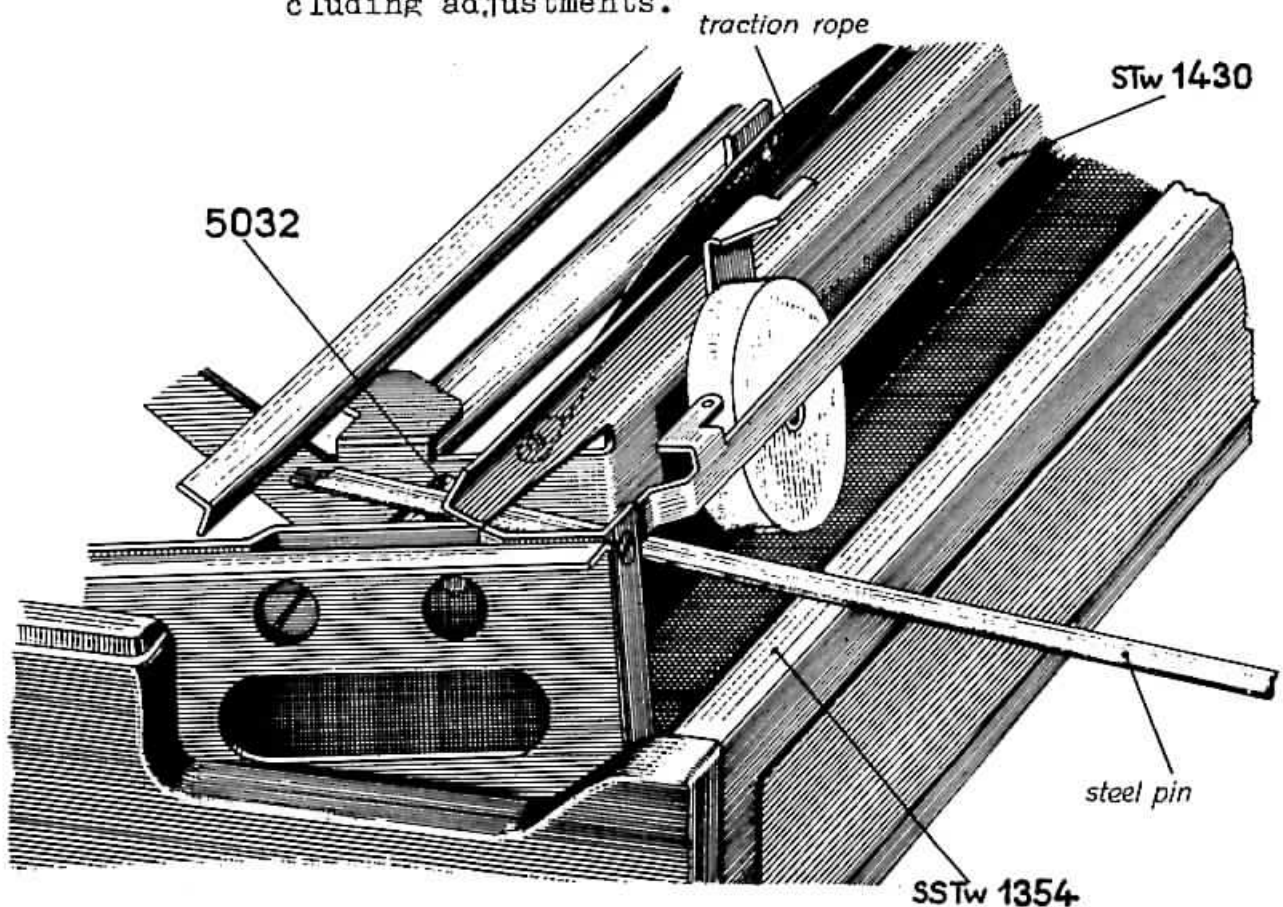
- 1) After the escapement has been replaced immediately turn fixing screws 4602 slightly and tighten later.
- 2) Form screw 5038 for back spacer pawl is inserted with spring screw driver. Screw is provided with a higher head and deeper slit in order to facilitate easier insertion.
- 3) A test should be carried out in order to see whether backspace tie rod Stw 1127 moves freely past the ratchet wheel of the escapement.
- 4) Special care should be taken when inserting the escapement that the bearing surface of the escapement support and the adjoining bearing surface of the back guide rail are completely free from dust, etc. Otherwise tension occurs when the escapement is screwed on; which changes the function and adjustment.
- 5) For the sake of safety after replacement has been completed the switch release on the type bar should be tested. This release of the switch movement normally occurs 4 mm. before the platen.

The following instructions for overhaul should be adhered to in connection with this instruction:

No.1/1 Removing of machine out of casing and replacement.

No.1/2 Removing of carriage and replacement.

No.3/2 Dismantling and re-assembling of escapement including adjustments.



Necessary tools:

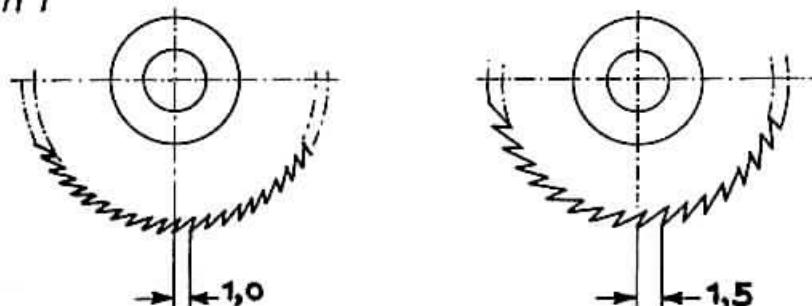
- 1 pin
- 1 spring hook RW 56
- 1 spring screw driver RW 38
- 1 screw driver RW 81 6 x 0,6 short
- 1 screw driver RW 82 3 x 0,25 long

A. Removing

- 1) Remove carriage from machine in accordance with I.O. No. 1/2.
- 2) Remove machine out of casing according to I.O. No. 1/1.
- 3) Make a mark of position of 3 fixing screws 4644 of ribbon mechanism on frame side wall with pin, so that the correct position is immediately found when replacing.
- 4) The fixing screws 4644 must now be loosened and care must be taken, that the washers 5563 which are inserted are not lost.
- 5) First the left mechanism is removed. For this purpose it is necessary to loosen the tie rod connection of carriage centre and reverse pawl (Srw 1463 and Stw 1464). It is advisable to mark the mutual position of these parts before separation, in order to be able to find the old position when re-assembling. Loosen screw 4636 with disc 5556 out of lever STw 1463.
- 6) Remove retaining screw 4843 for tension cord STa 1282 from lever STa 1023.
- 7) On the right side also loosen bearing screw 4843 for drawband 1282(a) from lever STa 1023(a).
- 8) From the right side unhook ribbon mechanism out of connection cord STa 1557 by turning and remove with tension cord STa 1282.
- 9) Unhook drawband STa 1282 out of ratchet support STa 1323.
- 10) Raise left ribbon mechanism with drawband STa 1282 and connecting cord STa 1557 and pull out of the machine towards the left.
- 11) Unhook drawband STa 1282 and connecting cord STa 1557 out of the left ribbon mechanism.

Both mechanism are now ready for further overhaul or exchange. When exchanging the various adjustment which have been carried out on them, must be observed. The cogging of the ratchet wheels has been especially changed, in order to make the ribbon feed safer. The delicate cogging has a distance of 1,0 mm. from tip of tooth to tip of tooth, if the cogging is coarse, this distance is 1,5 mm (see Illustration 1).

Illustration 1



B. Replacing

Replacing takes place from left to right, whereby care should be taken:

- 1) Hook back drawband STa 1282 into left ribbon mechanism and rehook connecting cord STa 1557, the latter in such way that the triangle on it is on the left of the right ribbon mechanism as can be seen from spare parts catalogue page 5. The left ribbon mechanism with the two afore-mentioned cords is inserted at the same time in such way, that the connecting cord STa 1557 is brought through Segment and line space plate and the drawband STa 1282 through the recess of double bearing bridge. Thereby tie rod STw 1463 of carriage stop is pushed through between wall of ribbon spool arm SStA 1314 and shaft of the mechanism and brought to screwing on position.
- 2) The left mechanism is immediately screwed on and all 3 screws, after examining the seat of the head are at first slightly tightened and then tightly.
- 3) Tie rods for carriage centre and reverse pawl are screwed on after the correct position by means of the markings are examined.
- 4) Drawband STa 1282 is now together with retaining screw 4843 again screwed on to lever STa 1023. It is recommended that for this purpose the ribbon switch is set on blue.
- 5) The right ribbon mechanism is inserted in the same way. Care should be taken that washer 5563 between ribbon mechanism and frame side wall is not forgotten. If this has been done, the test for smooth functioning can be carried out in the following manner:

C. Testing of Ribbon Feed

By pressing a type bar with the hand against the platen one can find out, how many teeth of the ratchet wheel the pawl conveys. If the cogging is coarse conveying should be 1,5 to 2 teeth, for minute cogging, 2 to 2,5 teeth, by very slow movement of the type bar. If this is not obtained, then drawband STa 1282 i.e. STa 1282 is shortened with the coupling iron, in order to take out possible play which might be in parts of transmission of motion. Now by careful tapping of key lever it is possible to observe, how far pawl STa 1306 i.e. STa 1324 comes near to dog STa 1315 i.e. STa 1297 in the end position. Both pawls must not hit each other, but also must not be too far apart from each other. The minimum distance for coarse cogging = 1 tooth and by fine cogging = 2 teeth. If the pawl comes too near to the ratchet, the rocker STa 1023 i.e. STa 1023a is bent with the coupling iron in the direction of the recorder, for which purpose the machine must be placed on its head.

D. Testing of Ribbon reverse

After the ribbon has been fixed the guide pins 4250 of the relevant switch levers (SSTa 1318 or SSTa 1300) are tapped and the spring i.e. the insertion of these switches in their end position is tested.

In both end positions the switch levers should not have any play. If this is not the case, then the relevant roller lever SSTa 1372 or SSTa 1347 should be appropriately shifted sideways, which is possible by loosening screw 4680. If the leaf spring of the roller levers does not have the necessary tension, i.e. is too hard or too soft, then the bearing angle, on which the roller lever is fixed, has to be bent slightly to the front or to the back and thereby the desired tension of the leaf spring is obtained. Furthermore, by switching over by hand the spring pressure of both leaf springs is synchronized to the same size through feeling. Finally testing of the ribbon reverse whilst typing has to be carried out. The length of the ribbon to be used has to be taken into consideration for the ribbon reverse. A short ribbon, for example 5 m, does not produce such a great ribbon spool diameter on the winding side as a ribbon which is 8 or 10 m long. If the ribbon is 8 m, the reverse takes place after 2 or 3 stops, whereas if the ribbon is 5 m it only takes place after 3 to 5 stops. The last stops before the reverse of the ribbon mechanism takes place are easily recognised because the thickness of the imprint diminishes. If the reverse takes place too late, then both ribbon automatic reverse are not properly engaged. It is important to see that the connecting cord STa 1557 lies tensionless in both switch levers. The connecting cord on the right side of the triangle is to be used to adjust the length of the cord. The main reason for the difficulty in getting the ribbon reverse to work is because on one of the automatic reverse the switch lever, the pawl and ratchet have already meshed, whereas on the other they have not been entirely lifted out of the cogging of the ratchet wheel. This fault is rectified by bringing about a tension free connection between both mechanisms.

REMOVING UND REPLACING OF CARRIAGE MAIN PLATE
WITH SIDE PANELS SSTw 3016

Group: Carriage

Necessary tools:

1 hammer 100 gr.	8d/WH 2	
1 short screw driver	4 x 0,6	RW 81
1 watchmaker's screw driver	8d/W	Schr 21
1 slit screw driver		RW 80
1 short screw driver	6 x 0,8	RW 81
1 spring hook		RW 56
1 round tong		RW 55
1 piercer 5 mm		
1 piercer 1 mm		
1 assembling iron for paper guide pan		
1 small spanner	8d/W	Schr 191
1 coupling iron		RW 20

It may be necessary to carry out this repair work in consequence of heavy transport damage to the carriage side panels i.e. bearing piece STa 3008 of line spacer on the left carriage side panel. Such damage has often been remedied by exchange of the carriage side panels SSTw 3006 or SSTw 3009. But we would strongly advise against this. The bearing holes in the bushings of the side panels for the platen are, when in operation, turned out exactly parallel to the prisms of the carriage main plate on a special fine lathe, according to gauge. This parallelism is lost when exchanging the side panels and cannot be restored by simple means of repairs. We therefore strongly advise, in order to remedy such damage, to obtain a complete carriage main plate with side panels and to use the parts taken out of the damaged carriage.

Instructions how to carry out such repair are given below:

A. Removing

- 1) Remove carriage from machine according to IO No. 1/2
- 2) Remove platen according to IO No. 1/3
- 3) Remove paper guide pan according to IO No. 1/5
- 4) Remove paper bail according to IO No. 1/12
- 5) Remove alignment guide according to IO No. 21/7
- 6) Remove margin stop rack according to IO No. 1/12
- 7) Remove line spacer according to IO No. 1/6
- 8) Remove detent roll SSTa 3064 according to IO No. 2/2

After this dismantling work has been carried through, the cam shaft 5861 for paper feed is removed. With the 1 mm piercer, pin 4014 is pushed out of the right release piston STa 3040. Then screw 5154 of paper release lever SSTw 3122 is loosened and the shaft is pushed to the right in the direction of paper release lever, until it falls out on the left bearing point of part STa 3011. Now the shaft is pulled back to the left, until the paper release lever SSTw 3122, bearing bridge STa 3039 and the right release piston STa 3044 fall off. Subsequently the two screws 5019 and the counter nuts 5209 belonging to them are removed from the carriage detent rail SSTa 3111. Furthermore it is necessary unhook draw spring 5670 as well as to remove nut 5207 from the guide screw 4745 and disc 5378. The whole of the carriage release rail can now be lifted off. After the further removal of the carriage rack STa 3107 and paper guide according to IO No. 1/11 dismantling has been completed.

B. Replacing

Replacing takes place in reverse order. The positions of the various parts of the carriage can be seen from the instructions for overhaul mentioned on page 1. Special attention should be given to the following points:

When replacing shaft 5861 into the step bearing STa 3010 and STa 3011 of the new carriage main plate, the paper release lever SSTw 3122 should at first be set loosely on the shaft.

The paper release lever is then staggered on the shaft in such way that it only has an effect on pressure levers STa 3070 after a distance of 5 mm has been travelled when pulling the two release pistons STa 3040. Consequently note should be taken as to whether the two stop pistons STa 3040 engage into the pressure levers STa 3017 at the same time. If this is not the case on one side or the other, then the bearing point, at which the release piston is first engaged, is bent slightly in the direction of the platen. When inserting the paper guide pan SSTw 3057 care must be taken that the back and front feed rolls do not touch one of the window edges of the paper guide pan. At the same time when the paper feed is open, a test should be made in order to see whether a minimum space of 0,8 mm is running along the platen. When replacing the carriage release rail SSTa 111 care should be taken that this rail is pressed down deeply enough and the difference in height of 0,5 mm provided for between the right pinion end and the left end of this rail is present. This difference in height is necessary, as the rail can easily spring.

As the new carriage main plate is not provided with a machine number, it is advisable, to engrave it on the underside of the new carriage main plate with a pin. Also after replacing of the carriage with the new carriage main plate has been completed, the running of the carriage should be tested, as well as the reverse in order to ascertain whether the carriage has the necessary play in every position. It is very important to pay heed to this, as perfect typing of the machine depends on the smooth, unimpeded run of the carriage.

REMOVING AND REPLACING OF TYPE BAR

Group: Frame

Necessary tools:

- 1 short screw driver 5 x 0,5 RW 81
- 1 supplementary shaft RW 59
- 1 supplementary mandrel for insertion of axle
- 1 Block with holes for placing down type bar tension cords

A. Removing

- 1) Remove front cover SSTw 1970
- 2) Unscrew cover plate STw 1333
- 3) With supplementary shaft RW 59, push back segment shaft until it has left the bearing of the type bar which is to be removed.
- 4) Pull type bar out of segment slot and unhook from type bar tension cord.

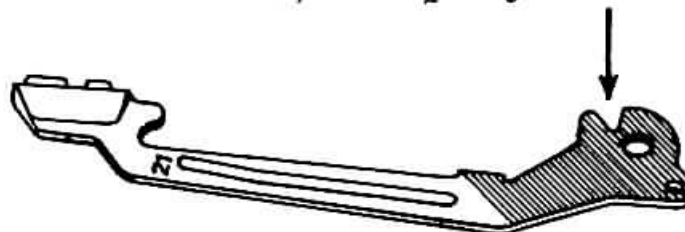
When removing individual type levers it is advisable to pull the tension cord forward and to place it on the type bar pad SSTa 1286,

If necessary, all type bars are removed in this way. In this case, however, it is advisable to take the type bars and type bar tension cords out one after the other, and to place the type bar tension cords in a block provided with drillings. The tension cords have various lengths and if this tip is adhered to, mix ups or time wasting sorting out work will have been avoided.

B. Replacing

Replacing takes place in reverse order. Care should be taken when replacing a new type bar that the thickness of this lever corresponds also with its bearing position in the segment. Normally spare type bars are delivered in the medium material thickness of 0,94 mm. If it should be difficult to fit the new lever into its segment slot, then it should be lapped on both sides of its bearing position (see following illustration).

lap subsequently marked surface



Necessary tools:

1 screw driver	RW 81	6 x 0,8
1 spanner	RW 68	6 mm = s
1 socket wrench	RW 89	6 mm = s
1 spanner	RW 65	6 mm = s
1 spring screw driver	RW 38	
1 pincer	8d WP 26	

A. Removing

- 1) Remove machine out of casing according to IO No. 1/1
- 2) Make a note of position of mark of hexagon head of screw 5034 (in order to facilitate finding position when replacing)
- 3) Remove lower shift limit screw 4728 with nuts 5210.
- 4) Remove double shoulder screws 5034 and nuts 5210
- 5) Loosen nuts 5273 for shoulder screws 4707 and remove screws. Thereby removing of the right or left shift arm is completed.

B. Replacing

Replacing takes place in reverse order. As the lower shift limit screws 4728 with nuts 5210 have been removed, the cushioning and impression and carriage fall must be tested after they have been replaced.

Care should be taken to see that after replacing of a new shifting arm, the screws 5034 and 4707 delivered by the factory and made to fit into it, are used and on no account those which were removed from the old shifting arm.

Necessary tools: Firm key heads

- 1 hammer 50 gr.
- 1 blunt chisel (brass or aluminium) 8 x 1,2
- 1 supporting frame
- 1 small file
- 1 flat pliers

Necessary tools: B. Sprung key heads

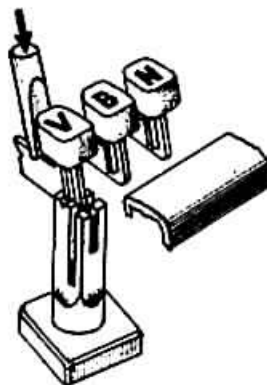
- 1 head remover RW 99
- 1 flat pliers

Two kinds of key heads are made by OLYMPIA Typewriters - class SM, namely firmly fixed key heads and on the newer typewriters sprung key heads. At first the exchange of firm key heads will be described.

1. To remove key heads.

Frame RW 26 is fixed in such way below the relevant key lever, so that the feet of the head sit on the frame and the key lever lies in the slot of the frame. As the machine would fall, when removing the lower row of keys, the frame is fitted with a short slot, into which the key lever of the lower row of keys can be fitted. It is advisable, also to fix a wooden bolt under one side of the typewriter. When working on the upper row the side of the frame with the long slot is to be used (see illustration 1)

Illustration 1



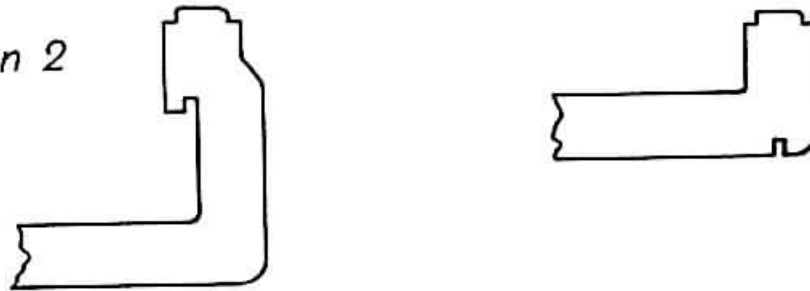
2. Replacing of key heads.

Please set the frame with short slot under the key lever near the mounting point. The head is set on the key lever and fixed with a small file. The radius of the file must approximately correspond to the radius of the cavity of the head, as otherwise one of the heads might break when mounting. The head should not be mounted quite to the bottom of the slot. Usually the heads are 0,4 mm apart. Further when fixing them care should be taken to make sure that the height of the head also corresponds to the general height of the relevant row of keys and if necessary be adjusted.

Spring mounted Key heads

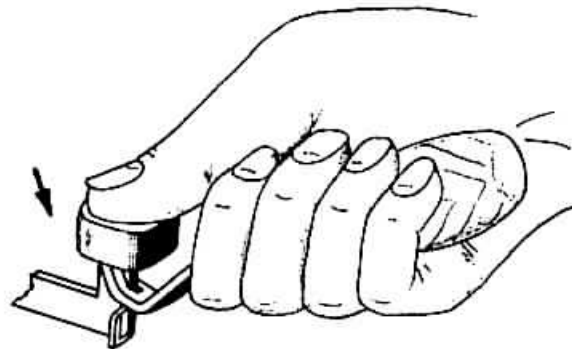
A difference in the shape of the spring mounted key levers between the first and second row of keys and the third as well as the fourth row should be noted. The following illustration 2 shows the difference. Accordingly there is a slight difference in the procedure in removing and replacing.

Illustration 2



1. Removing of heads: (key board row 3 und 4)
The head remover RW 99 is fixed below the key head and the key head is depressed with the thumb of the same hand, until the pressure spring in the head is compressed. The relevant key lever is supported with the other hand, so that the head can be lifted out of the groove of the key lever. As soon as this has been done, the head is compressed. The relevant key lever is supported with the other hand, so that the head can be lifted out of the groove of the key lever. As soon as this has been done, the head is pulled sideways downwards and thereby removal is completed (see illustration 3)

Illustration 3



2. Replacing of heads: (key board row 3 and 4)
The new key head is fitted with the spring and guiding plate of the old head. Thereby it should be noted that the plate cross has two slots of different width. The spring key head which has now been fitted together is placed on the frame in the known manner, the spring is pressed together by pressure of the thumb and hooked with the foot of the head first into the groove of the key lever in the same slanting position as when being removed. Then the whole is swung upwards into the upright position.

The remover is now removed from key head and the spring plate of the key head falls into its position on key lever. A test should then be made to ascertain whether the resilience is light and without friction. It is advisable to slightly oil the sliding points.

3. Removing of heads (key board row 1 and 2)
Removal takes place in approximately the same way as on rows 3 and 4, but the head is pulled forward and then allowed to fall after the remover has been taken away. Take hold of the head with 2 fingers and lift out at the back over the key lever head. Please take note of the following illustration.

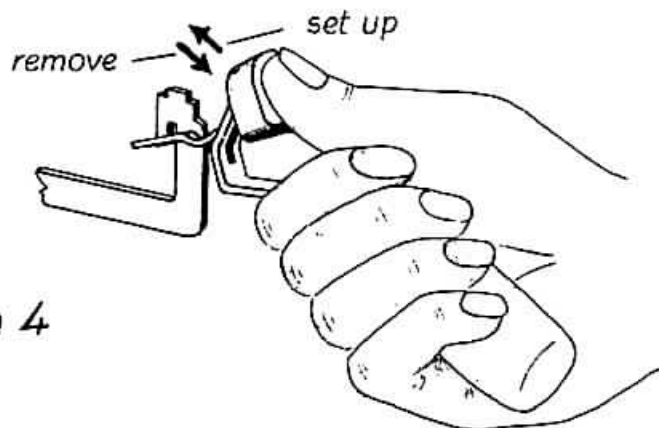


Illustration 4

4. Replacing of heads. (key board row 1 and 2)
Take hold of the key head with the remover in the known manner, press together and brush over the key lever head. Now the head is swung upwards and the remover is taken away. The plate now falls into its seat on the key lever. The gliding surface should be oiled immediately and tested, in order to ascertain that the spring suspension moves easily and without friction.
In any case, whether it be an ordinary keyboard or one that is sprung, after exchange of key heads the key levers must be adjusted so that they are an equal distance apart from each other and are of the correct height. Whereas the height is adjusted when the key heads are fixed as far as the firm key board is concerned, a slight raising by inserting the flat pliers under the relevant key lever on key rows 3 and 4 of the sprung key board can be carried out, without pushing the head very much out of its perpendicular position either forward or backwards. Furthermore a test must be carried out to see whether the letters of the new heads are parallel with the other letters. If not the key lever should be adjusted.

EXCHANGING OF SPACE BAR

Group: Frame

Necessary tools:

- 1 hexagon shaped key RW 1 = 6
- 1 watch makers screw driver
- 1 pointed plier
- 1 screw driver RW 81 8-08

I. Removing

Remove carriage from machine according to I.O. 1/2.

Remove machine out of casing according to I.O. No. 1/1.

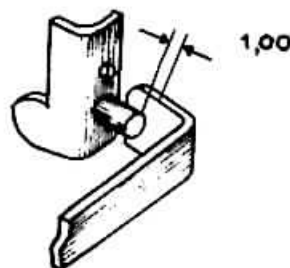
- 1) Unscrew space bar board STw 1221.
- 2) Loosen counter nut 5273 on trunnion 4220 for the space bar shaft and turn it until the shaft is free.
- 3) Unhook tension rod STw 1224 from lifting arm by bending it sideways (if necessary unscrew it)
- 4) Bend hooking arm on right torsion spring and bend key cam flap downwards. Unhook torsion spring.
- 5) Pull the whole space bar shaft out of the left torsion spring w 5800 and let the torsion spring hang down. Removing is thereby completed.

II. Replacing

- 1) Insert space bar shaft into left torsion spring and swing it into position for replacing.
- 2) Fasten right torsion spring with bent arm and hook it into key cam flap.
- 3) Place space bar shaft on both sides on trunnions.
- 4) Bend back arm of right torsion spring again, as well as key cam flap. Tighten torsion spring by one turn.
- 5) Adjust 0,1 mm side play between the space bar shaft and trunnions and fix castellated nut 5272.
- 6) Place lifting arm SSTw 1218 next to key levers, without touching them.
- 7) Hook back tie rod STw 1224 into lifting arm (into trunnion i.e. screws)
- 8) Replace machine into casing according to I.O. No. 1/1
- 9) Test to see whether space bar lies evenly on stops in front of the frame.
- 10) Adjust space bar switch movement.

The idle motion between lifting arm STw 1316 to pin on switch should be 1,0 mm. This distance must be kept. See Illustration 1.

Illustration 1



EXCHANGE OF SPACE BAR**Group: Frame**

Adjustment is carried out by loosening of both ring screws 5154 on lifting arm on the space bar shaft and appropriate turning of it.

- 11) This adjustment is to be tested in both reverse positions. If there is a considerable difference the back lifting arm STw 1316 should be twisted slightly (long drillings)
- 12) Screw the space bar board on to the space bar levers in such manner, that it lies symmetrically in the recess of the front part of the frame and can move freely towards all sides.
- 13) Replace carriage according to I.O. No. 1/2.

EXCHANGE OF SWITCH LEVER STa 1081 AND
PAWL STw 1441 FOR BACK SPACER**Group: Frame**Necessary tools

- 1 angular screw driver
- 2 spring hooks
- 1 pincer
- 1 spring screw driver
- 1 long screw driver 3 mm x 0,4

I. Removal

The machine can remain in its casing. The back part must be taken off.

- 1) Remove carriage according to IO No. 1/2
- 2) Unhook spring 7679 from pawl and let it drop.
- 3) Remove screw 5038 or sliding bolt 5303.
- 4) Remove escapement according to IO No. 1/24.
- 5) Loosen bearing stop screw 4636 and disc 5305 on switch lever STa 1081 with angular screw driver and remove.
- 6) Unhook torsion spring 5804 on both sides.
- 7) Remove switch lever STa 1081 as well as torsion spring 5804 from bearing pivot 4244. Now the switch lever or pawl can be exchanged.

II. Replacing

Replacing takes place in reverse order.

EXCHANGE OF TYPE BAR SUPPORT**Group:** FrameNecessary tools:

- 1 short screw driver RW 81 3 x 0,4
- 1 spring screw driver
- 1 pincer

I. Removing

- 1) Remove top front cover
- 2) Raise type bars 6 and 7 and 38 and 39 and clamp, so that they will remain raised.
- 3) Loosen screws 4636 for support.
- 4) Remove further type bars if necessary and then wind support first on one side, then on the other side with its strut through the tension cords.

II. Replacing

- 1) Insert new support in the sameway and screw down, so that the intermediate bars lying close by are not touched on their struts.
- 2) Test, whether the outer type bar would come to rest on the supports (without cushion). If necessary adjust by slightly bending. The intermediate bars must not be obstructed by the struts.
- 3) Test to find out whether type bar shoulder is approximately 1 mm over support. This is not the correct height of the support.
- 4) Insert cushion (see illustration given below)
- 5) By exchange of support bring the tension cords, which might have been bent into correct position.



II
R E P A I R

REPAIR OF LINE SPACER

Group: Carriage

Necessary tools:

- 1 watchmaker's screw driver
- 1 screw driver RW 81 6 x 0,6
- 1 screw driver RW 82 8 x 0,8
- 1 slotted screw driver RW 80 4 M 3
- 1 spring hook
- 1 round tongs - Langbeck
- 1 socket wrench s = 5 mm
- 1 stepped piercer 4 mm. by 5,5 mm ϕ
- 1 100 gr. hammer

Fault No. 1. The platen lock cannot be loosened

Cause: The lug on the ratchet lever STa 3061 is broken off, or bent.

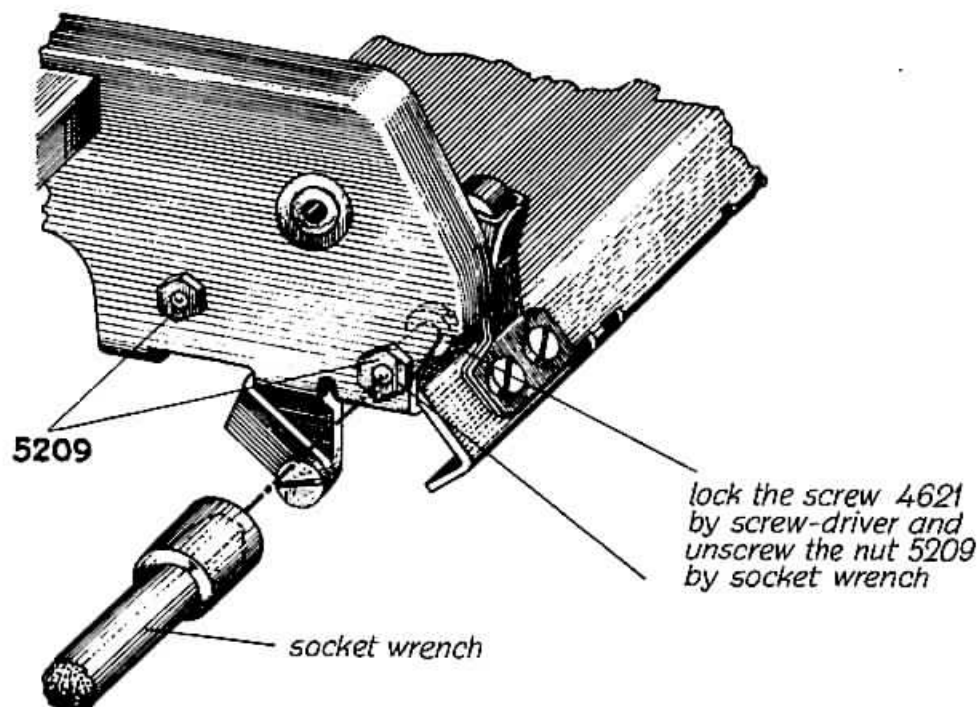
- Adjustment:
- 1) Remove line spacer in accordance with I.O. No. 1/6
 - 2) Examine whether lug on the ratchet lever STa 3061 is bent or broken off
 - 3) If lug is broken, put in new ratchet lever 3061 by means of unscrewing nut 5209 from screw 4621. If lug is bent, straighten it.

Fault No. 2. The release lever SSTw 3045 for platen detent falls back.

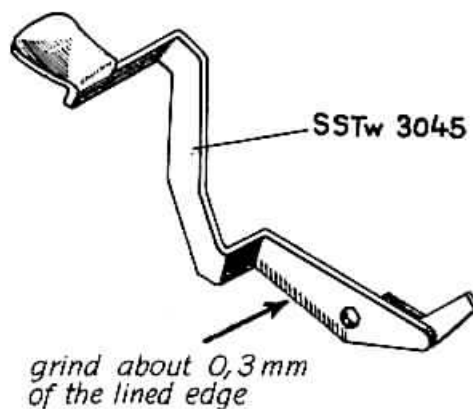
Cause: The lug of the release lever SSTw 3045 is worn out.

- Adjustment:
- 1) Unscrew left cylinder knob SSTw 3080a.
 - 2) Remove left cover plate Stw 3033.
 - 3) Unscrew nut 5209 which is on the outside of the left carriage side panel by means of socket wrench and at the same time hold screw 5076 on the inside with a screw driver and remove. (See Illustr. 1)

Illustration 1



- 4) Exchange release lever SSTw 3035 for a new one. To be on the safe side, the edge of the lever indicated in illustration 2 should be smoothed off.
- 5) Replace in reverse order.



REPAIR OF DETENT FOR LINE SPACER

Group: Carriage

Necessary tools:

1 screw driver	RW 81	6 x 0,4
1 screw driver	RW 81	3 x 0,3
1 hammer 100 gr.		
1 flat punch		
1 drawing pin		
1 pointed tong		

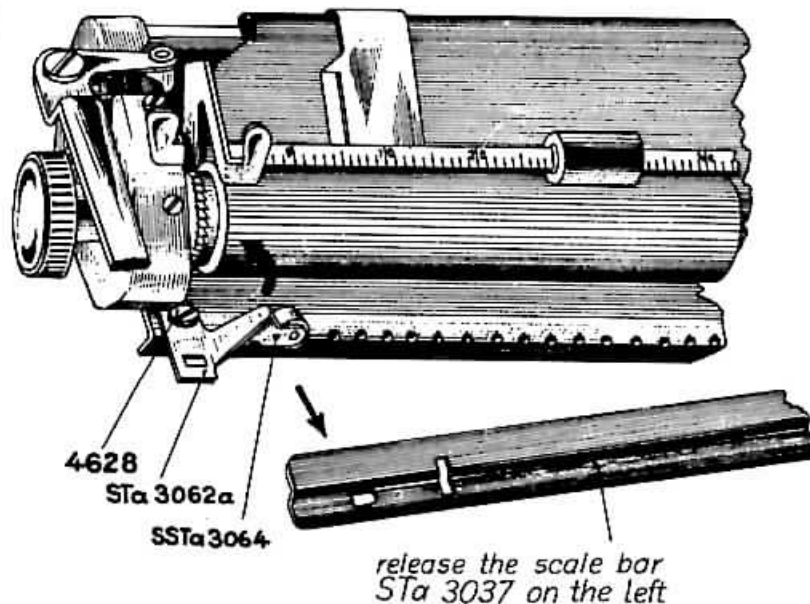
Fault: The platen can not be stopped by cylinder lever.

Cause: The supporting spring Sta 3062a for the roller lever SSta 3064 is broken.

Adjustment: Repairs can be carried out without removing carriage from machine.

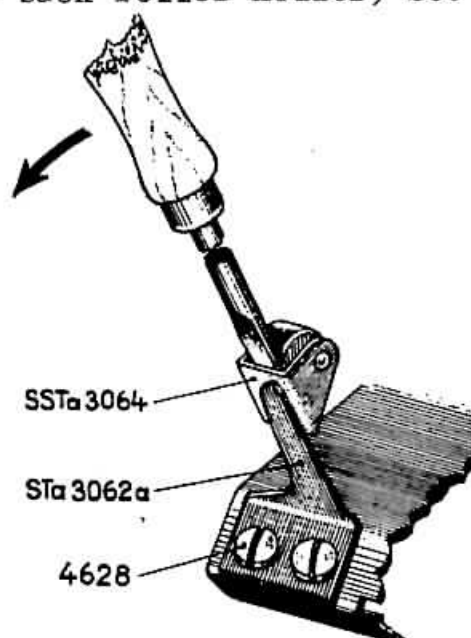
- 1) Remove cylinder lever SSta 3064 with holding spring Sta 3062a.
- 2) Place machine edgewise, the underside towards mechanic. Run carriage to the left and loosen left bearing screw for alignment guide Sta 3037. (Make a mark with drawing pin around both screw heads on carriage plate, so that when replacing, the old position of the bearing can quickly be found)
- 3) Bring machine back to normal position and fix cylinder lever SSta 3064 with new supporting spring Sta 3062a first with left screw and then swing with the aid of the tongs into working position.

Illustration 1



- 4) Tighten left screw on roller lever securely, so that spring tension is minimised and then insert right screw.
- 5) Examine whether cylinder lever 3064 SSta is cleared by the release lever SStw 3045 and releases the line spacer ratchet wheel Sta 3128. If this is not the case, then the cylinder lever has too much tension and must be slightly bent back (Insert narrow screw driver between cylinder and cylinder holder and bend back roller holder) See illustration 2.

Illustration 2



- 6) Now the left alignment guide bearing with alignment guide can be fixed again. Place screw heads on marked positions and see to it that alignment guide fits well on platen.
- 7) Now the backlash and over-throw of platen should be examined. For this purpose the line space lever Stw 3059 is set on 1 and the paper feed rolls with paper release lever SStw 3122 are loosened from the platen. If the line spacer is moved several times the platen must be carefully watched after the switching movement has been completed, in order to find out, if, after the line space lever SStw 3052 is back in its original position, the platen moves slightly to one side or the other away from its proper position. (This short after movement of the platen is called Backlash or overthrow. Should the platen fall back slightly then the two screws on the cylinder lever must be slightly loosened and the cylinder lever pushed a little higher. If the platen falls forward, then the reverse is done. See illustration 3 and 4 on page 3.

Illustration 3

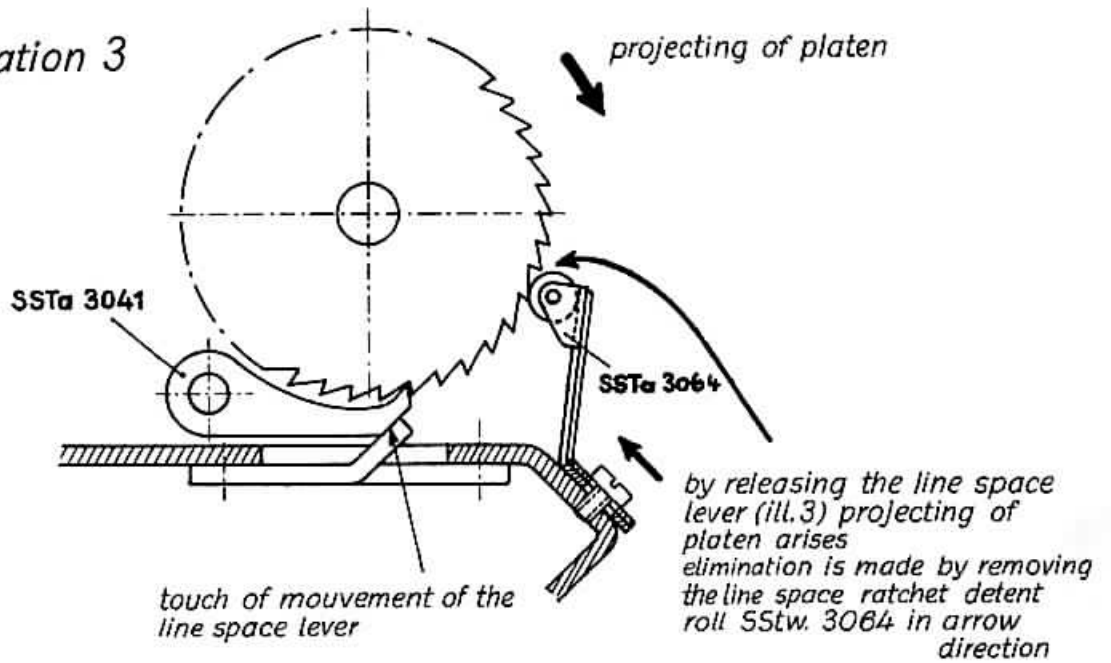
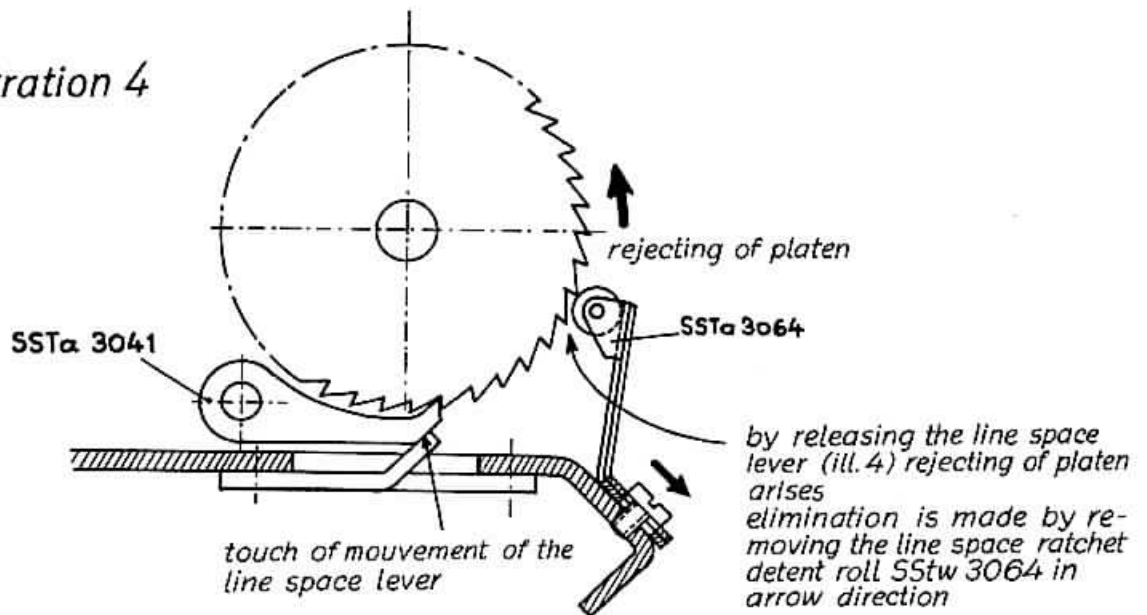


Illustration 4



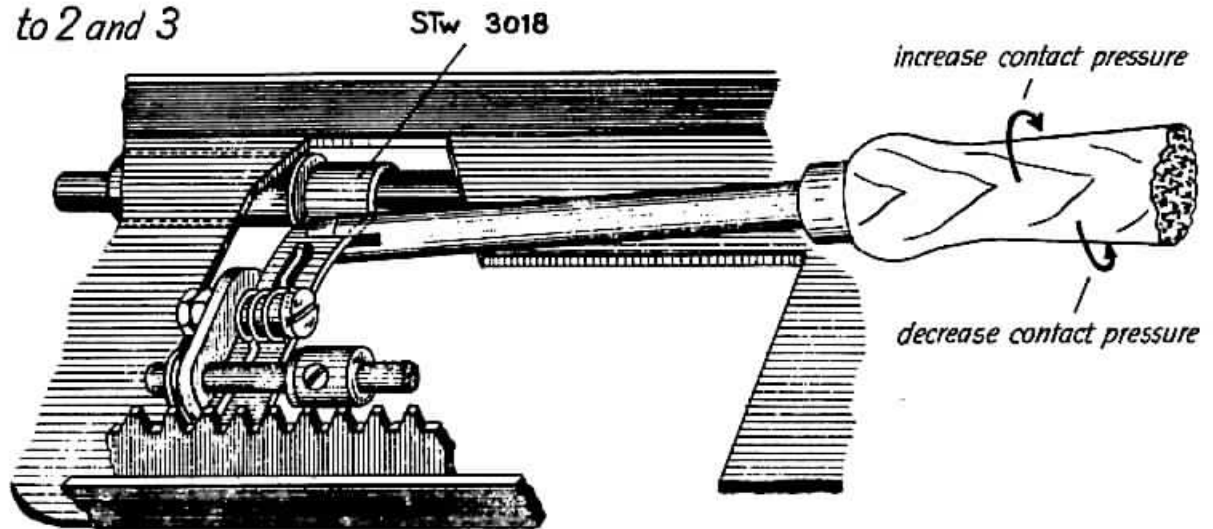
Fault: Paper moves askew.

- Cause:
- 1) Bail roller of front feed roll SSta 3035 i.e. of rear feed roll SSta 3034 have become unrounded because machine has been standing a long time under tension.
 - 2) Bail rollers do not run parallel to platen.
 - 3) Left and right pressure spring 5752 and 5753 of lever Sta 3020 i.e. lever Sta 3018 have different tension.
 - 4) Shaft 5860 of front feed roll SSta 3035 is running dry.
 - 5) Bail rollers Sta 3090 on paper bail rod Sta 3085 lie to one side on the platen and do not move easily.
 - 6) Platen has been turned with strong pitch.

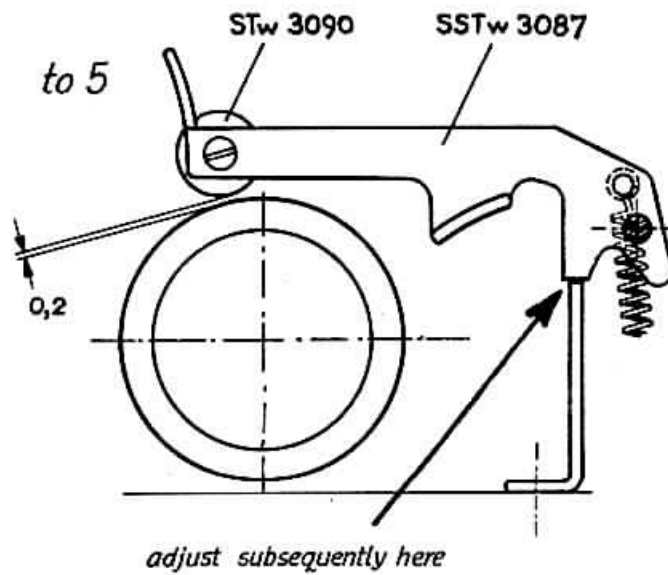
Adjustment:

- To 1) Move platen with closed paper feed several times backwards and forwards, thereby the feed rolls roll cylindrically. If the feed rolls have become too hard, then the feed roll must be exchanged for a new one.
- To 2) The parallel position of the front feed rolls to the left or to the right is altered by bending lever Sta 3018 or Sta 3020, flat or at right angles and the pressure of the roller is thereby diminished or increased.
- To 3) Pressure springs 5752 and 5753, which lie on levers Sta 3018 and Sta 3020 are adjusted to the same turning movement. Slightly oil all bearing points of torsion spring - shoulder ends, in order to remove possible frictional loss i.e. to adjust it.
- To 4) Remove front feed roll SSta 3035. Polish bearing points and slightly oil.
- To 5) Adjust paper bail rod Sta 3085 on both levers SStw 3087 and SStw 3121 and see to it that the rollers Sta 3090 are parallel having a distance of 0,2 mm. to the platen.
- To 6) Polish rotating grooves crosswise. The platen should be polished with emery paper and slightly roughed. (Please take note of the following illustration. Also refer to I.O. 1/11 for removal of front and back feed rolls.)

to 2 and 3



to 5



Fault:

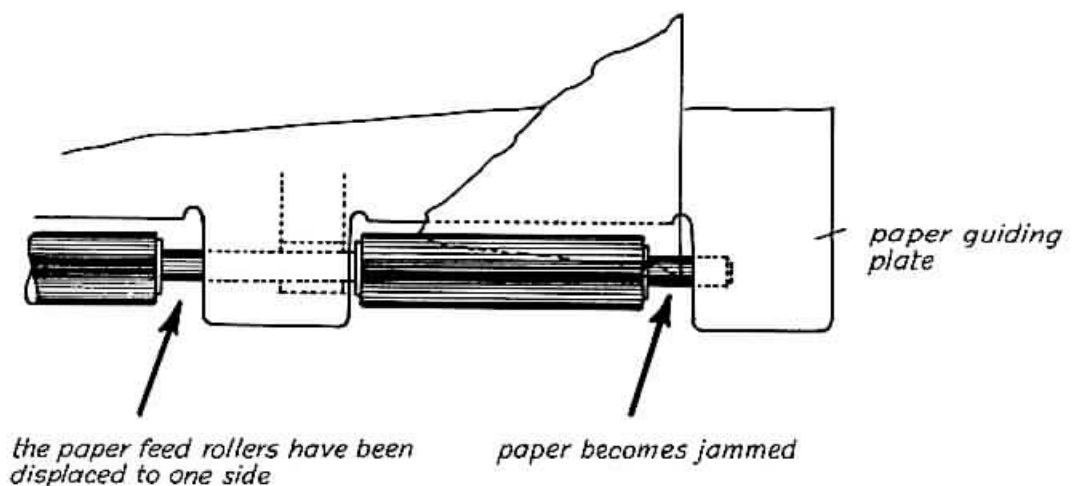
The top of several inserted sheets of paper does not move, whereas the carbons alone are fed through.

Cause:

- 1) There are too many sheets of paper and carbons. The throat between platen and paper pan is 1 mm.
- 2) Carbon paper which is too glossy increases slippage.
- 3) At some time during repairs the paper pan was knocked resulting in an indent being made on the inside. Any elevation on the inside of the pan stops the paper feed and also causes a sideways pull.
- 4) At some time during repairs the paper table was exchanged and not built in properly. The feed rolls are not in correct position to the windows (are transposed to one side). Therefore the original arch springs on one corner in the side window opening and which is too large gets hooked up there.
- 5) The platen on account of long usage has become too smooth.

Adjustment:

- To 1) Watch the paper thickness.
 To 2) Use only good carbon paper
 To 3) Test paper pan, if necessary change it.
 To 4) Insert paper table properly according to IO 1/5.
 To 5) Cleanse platen and feed rolls with emery paper cross wise.



REPAIRS TO PAPER FEED

Group: Carriage

Fault:

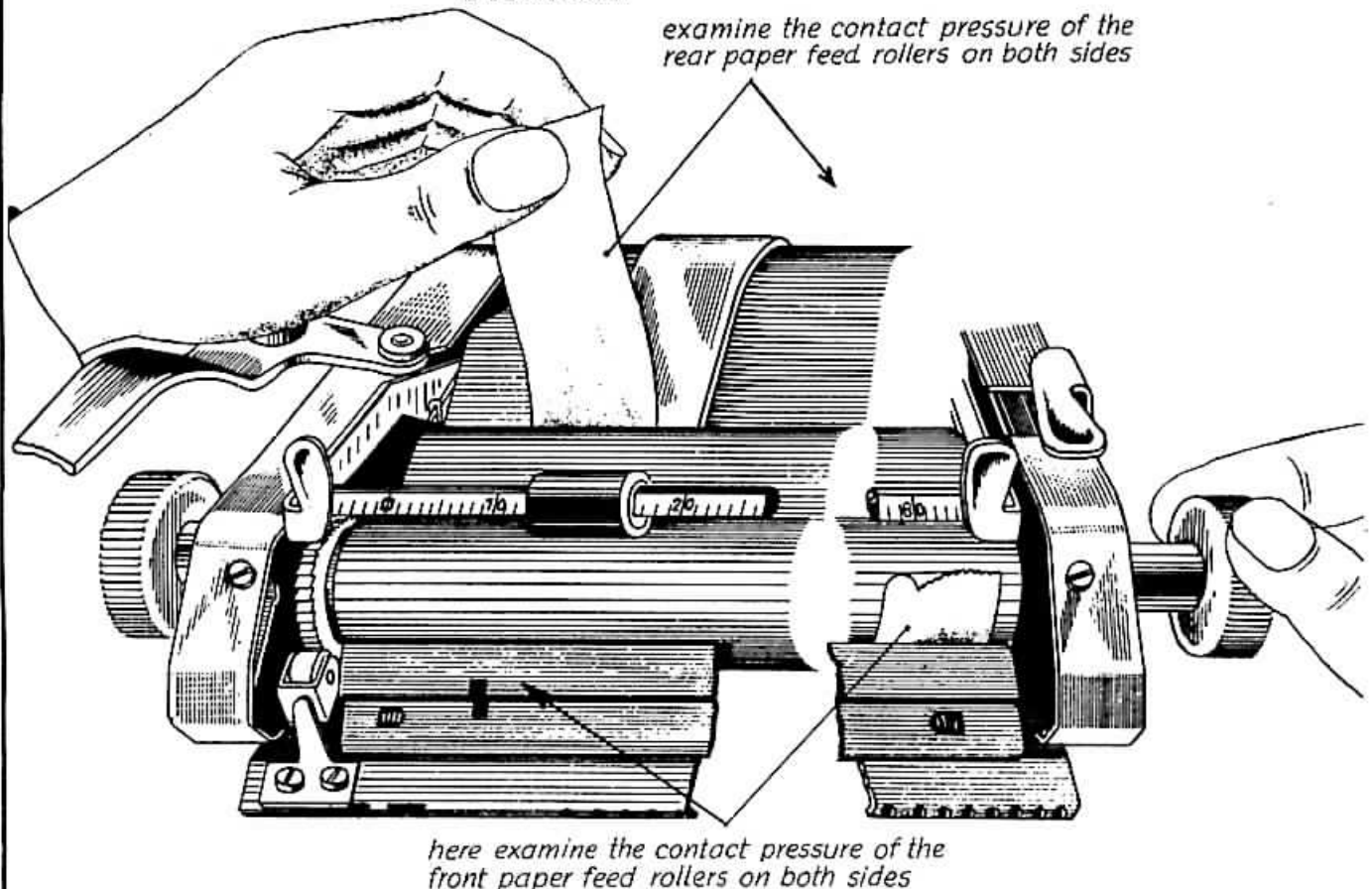
The paper which has been inserted creases.

Cause:

- 1) The top or the whole set of papers has not been inserted smoothly.
- 2) Paper feed rolls have varying diameters, pressure on platen is uneven or the feed rolls pull askew .
- 3) Feed rolls are out of true or out of centre.
- 4) Rollers Sta 3090 on paper bail rod Sta 3085 lean to the left and to the right (especially noticeable on airmail paper)

Adjustment:

- To 1) Immediately after the paper has been inserted the paper release lever must be quickly opened and shut. In this way the inserted paper is allowed to expand.
- To 2) Examine pressure and running of feed rolls. Cleanse bearing points and oil. Regulate gripping.
- To 3) Remove feed rolls and polish or exchange against new ones.
- To 4) Set paper bail anew. Both rollers must be 0,2 mm. clear over the platen and be easily turnable.
- Testing of pressure of feed rolls by means of paper strips for the front and rear feed roll can be seen from the following illustration.



REPAIRS TO PAPER FEED**Group:** CarriageFault:

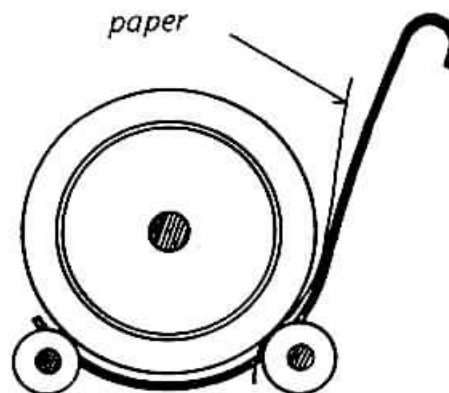
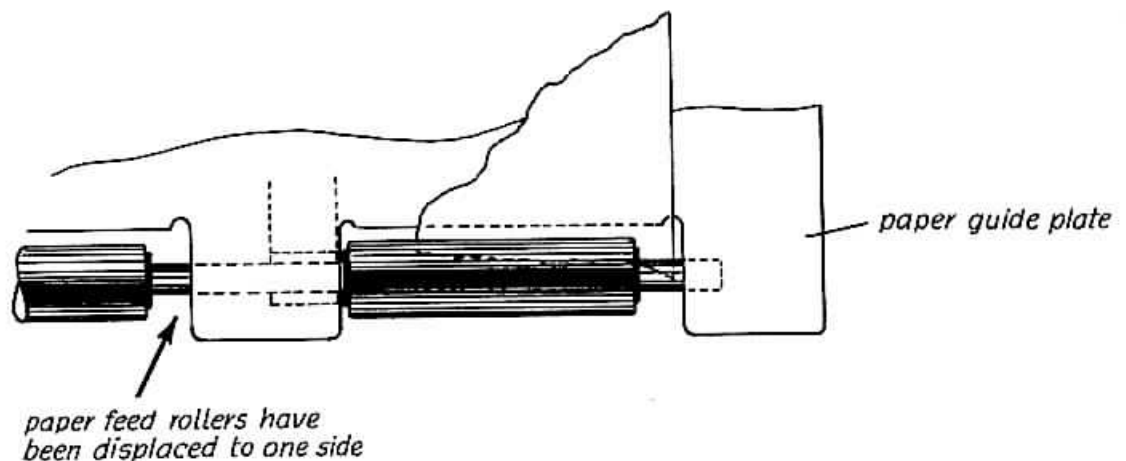
Paper tears when being inserted.

Cause:

- 1) Feed rolls are fitted to one side in the windows of the paper table.
- 2) The window edges of the paper table have arris or the paper pan has dents inside (such dents can be caused by a knock with a sharp edged tool from the outside).
- 3) The paper holder arm of the line height indicator Sta 1290 is too near to the platen, whereby the edge of the paper gets caught at this point.

Adjustment:

- To 1) Adjust paper table.
To 2) Remove paper table and examine for arris or dents.
To 3) Adjust line height indicator Sta 1290 with paper holder to the correct distance from platen.



Fault: Carbon paper leaves long lines on carbon copies.

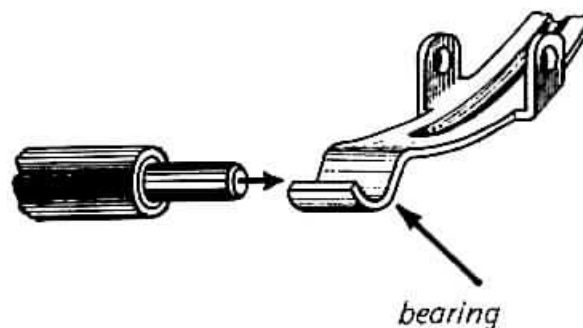
Cause:

- 1) Feed rolls are out of true through long standing under tension.
- 2) Feed rolls are too tight.
- 3) Rollers on paper bail press or have insufficient play.
- 4) Feed rolls with badly torn edges are in paper feed.
- 5) Bearing points of pressure arms for the front feed roll are open too far, whereby the front feed roll is inclined to work itself out of the bearing points.

Adjustment:

- To 1) By turning the platen several times back and forth, the feed rolls are once more cylindrical. But if the feed rolls are too hard, it is advisable to exchange them.
- To 2) Examine pressure of all feed rolls and if necessary adjust the front arms. Slightly oil bearing points of torsion springs 5752 and 5753. Slightly oil bearing points of front feed roll.
- To 3) Adjust paper bail, so that rollers lie 0,2 mm over platen and if necessary adjust rollers.
- To 4) Remove feed rolls and adjust, if necessary exchange.
- To 5) Adjust bearing point of pressure arm to the rounded part of the feed rolls.

The following illustration represents one of the open bearing points for the front feed roll.



REPAIR TO AUTOMATIC RIBBON REVERSE**Group: Frame****1) Ribbon feed does not work:**

- Cause:**
- a) Torsion spring 5807 or 5810 has been unhooked when cleaning with brush.
 - b) Tension spring 5680 for pawl has been stretched when cleaning, unhooked or broken off.
 - c) The dog eyelet - or tack - in ribbon has been jammed in both pins of the shift lever SStA 1318 i.e. SStA 1300.
 - d) The front edge of the brake flap has become jammed in the recess of the spool plunger.
 - e) The brake flap has become blocked through the unwound dog tack of the ribbon.

Adjustment:

- To a) Hook back torsion spring.
- To b) Hook back tension spring or renew it.
- To c) Bend tack on upper edge of ribbon.
- To d) Insert break flap with enlarged radius.
- To e) Insert break flap with enlarged radius.

2) Ribbon reverse is blocked

- Cause:**
- a) Connecting rod Sta 1557 does not connect shift lever SStA 1318 and SStA 1300 of both automatic ribbon reverses properly.
 - b) The ribbon is frayed on its lower edge and pieces of cotton wind themselves around the core.
 - c) Teeth of shift lock catch or ratchet pawls are damaged.
 - d) Hooks of drawband Sta 1282 or Sta 1282a are too wide open, hooking holes in pawls Sta 1323 i.e. Sta 1305 are deflected. Thereby drawband become displaced to one side and block the carriage reverse as well as ribbon feed.

Adjustment:

- To a) Couple connection rod STA 1557 anew.
- To b) Insert new ribbon, remove threads of cotton, which might remain from old ribbon.
- To c) Renew worn shift - or ratchet pawls.
- To d) Bend hook of the drawband STA 1282 i.e. STA 1282 a into a sharp angle. If necessary exchange pawl bearer STA 1323 or STA 1305.

3) Switch lever SStA 1318 or SStA 1300 flutters.

- Cause:** One of the roller arms SStA 1372 i.e. SStA 1347 has the wrong tension.

- Adjustment:** Bring about normal tension between shift levers by adjusting roller lever. When regulating the roller lever care should be taken, that the leaf springs do not touch the lower edge of the spool shaft.

4) Bearing plate SStw 1428 or SStw 1423 is broken

The cause of a broken bearing plate can be damaged during transport or improper removal of front cover SStw 1970.

- a) Before removing bearing plate a mark should be placed on it as well as on spool shaft and the markings from the old bearing plate transferred to the new one.
- b) Loosen both fixing screws 4636 and remove with discs 5530.

Now the new bearing plate can be fitted. Each time the bearing plate has been exchanged, the whole of the ribbon mechanism should be examined, as it is possible that the force which brought about the breaking of the bearing plate, has also possibly effected parts of the ribbon mechanism.

REMOVAL AND REPLACING OF PARTS OF AUTOMATIC
RIBBON

Group: Frame

Necessary tools:

1 screw driver	RW 81	6 x 0,5
1 watch maker's screw driver	8d/W Schr. 21	
2 Spring screw drivers	5 mm Ø and 3 mm Ø,	RW 38 i.e. RW 88
1 pincer	8d/WP 28.	
1 short pointed tong	8d/WZ 43	
1 socket wrench	RW 71	5,5 mm = s

1) Removal and replacing of shift lock catch STa 1324 and ratchet pawl STa 1315.

- a) Remove front cover SSTw 1970.
- b) Remove ribbon spool with ribbon
- c) Unhook spring 5680 with pincer out of shift lock.
- d) Unscrew shift lock or ratchet.

Replacing takes place in reverse order. Care should thereby be taken that there are two different kinds of shift locks and ratchet pawls, i.e. for ratchet wheels with fine teeth and ratchet wheels with coarse teeth. The shift lock i.e. ratchet pawls for ratchet wheels with fine teeth have a tooth which is 0,4 mm. shorter than shift lock catches and ratchet pawls for ratchet wheels with coarse teeth. No functional disturbances are caused if they are mixed up. Care should be taken when screwing on shift lock catches or ratchet pawls, that they mesh directly into the ratchet wheel and do not lie on the curve of the shift lever. Attention to this ensures that when the ratchet is unscrewed no tension obstructs the normal ribbon feed for the insertion of the shift lock - or ratchet pawls under the ratchet wheel. The exchange of shift lock and ratchet pawls on the right automatic ribbon reverse is carried out in the same manner.

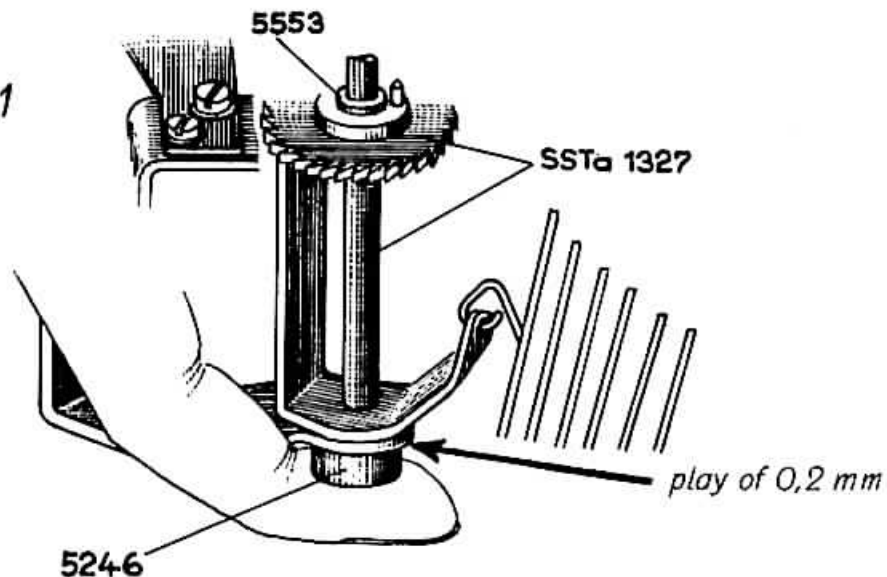
2) Replacing and removal of ratchet wheel SSTa 1327 with shaft

In addition a long screw driver RW 82, 3 x 0,4 is required for this kind of work.

- a) Remove front cover SSTw 1970.
- b) Unscrew front cover plate SSTw 1956. It is advisable to make a mark as to the height of the front cover plate, as described in IO No. 1/1.
- c) Remove set collar 5246 which is on shaft 5856 by loosening the headless pin 4172.
- d) The ratchet wheel with shaft can now be pulled out upwards out of ribbon mechanism.

Replacing takes place in reverse order. When inserting a new ratchet wheel one must not forget to remove leather disc 5553 from the old ratchet wheel and to place it on to the new one. Furthermore care should be taken to see that the shaft of the new ratchet wheel moves easily in its bearing. It is advisable to insert set collar as illustrated on illustration 1, page 2. The set collar should be brought so close to the lower bearing, so that the play of the ratchet wheel with its shaft is approximately 0,2 mm. high.

Illustration 1



3) Removal and replacing of control lever SSTa 1318 i.e. SSTa 1300.

- a) Remove front cover SSTw 1970.
- b) Remove front cover plate SSTw 1956.
- c) Remove ratchet wheel according to paragraph 2.
- d) Unhook spring 5680 out of ratchet pawl.
- e) Loosen nut 5209 and remove with disc 5530. In order that nut 5209 can be easily reached with the bent socket wrench, 3-4 of the left outside type bars should be removed when closed from cushion and approximately halfway.
- f) Control lever can now be pulled out upwards and by a turning movement unhooked from connecting cord STA 1557.

Replacing takes place in reverse order. The machine is tilted to one side in order to insert nut 5209 and disc 5530 is placed on the bearing pivot on shift lever with the pincer. Then the nut is inserted into the bearing pivot with the finger and wound on to the thread. The nut must be securely tightened with the socket wrench. After replacing, the ribbon revers in question must be tested. Special attention should be paid to the functioning of the roller arm SSTa 1372 i.e. SSTa 1347 as this can be easily bent when overhauling.

4) Removing and replacing of brake lever STw 1449 i.e. STw 1424.

Because a number of ribbons are provided on the inside end with a conveyor pin or conveyor loop, an indent is caused on the side of the ribbon which is wound up. This indent can press against the front edge of the brake flap and prevent proper ribbon feed. This may also happen if the notch on the spool core is too big and the edge of the brake flap becomes caught in this notch. In order to prevent this fault the brake flap has been provided with a greater diameter.

- a) Remove spring ring 5407 when dismantling.
- b) Flap can be pulled upwards.

Before insertion torsion spring 5789 i.e. 5790 must be tightened and when replacing inserted into flap.

ESCAPEMENT: CARRIAGE REMAINS STATIONERY

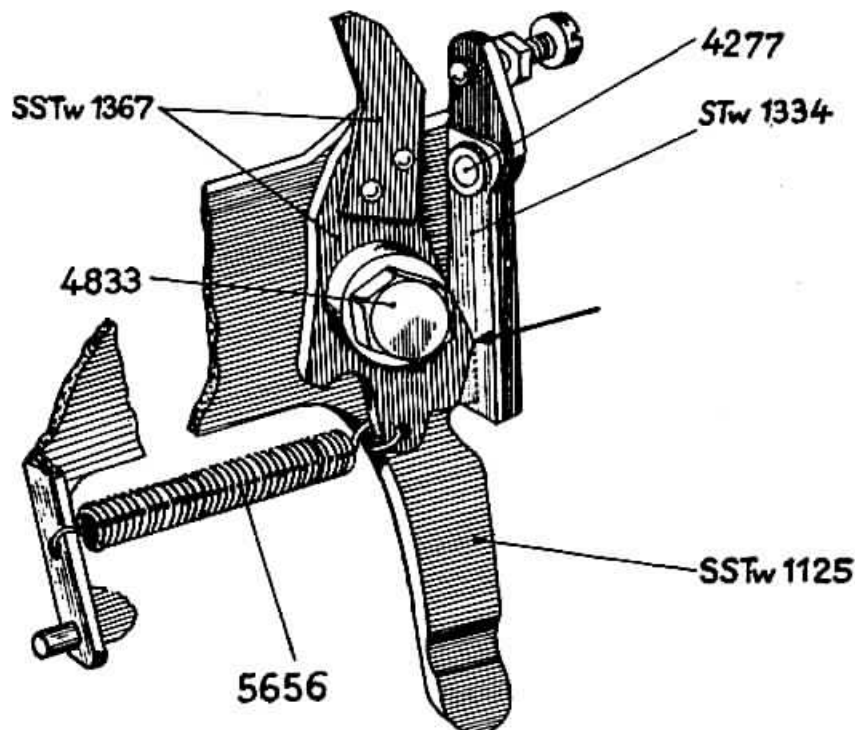
Group: Frame

Fault 1:

Heavy layer of cadmium of spring leaf Stw 1334 produces wedging of the loose escapement tooth SStw 1367 in normal position.

Adjustment:

- 1) Remove escapement SStw 1126 (see instructions for overhaul 1/24)
- 2) Remove escapement out of escapement frame.
- 3) Remove loose escapement tooth SStw 1367 by holding in eccentric position.
- 4) Remove layer of cadmium with scraper from leaf spring Stw 1334.
- 5) Round off ball shaped stop face of loose escapement tooth on edge as indicated on the illustration below with an arrow and polish it.
- 6) Re-assemble escapement.

Fault 2:

Too tight seating of crank pin 4833 in loose escapement tooth SStw 1367. It is possible that low hub surface of loose escapement tooth has remained too sharp edged in consequence of change of work and rubs on the galvanised surface of the escapement.

Adjustment:

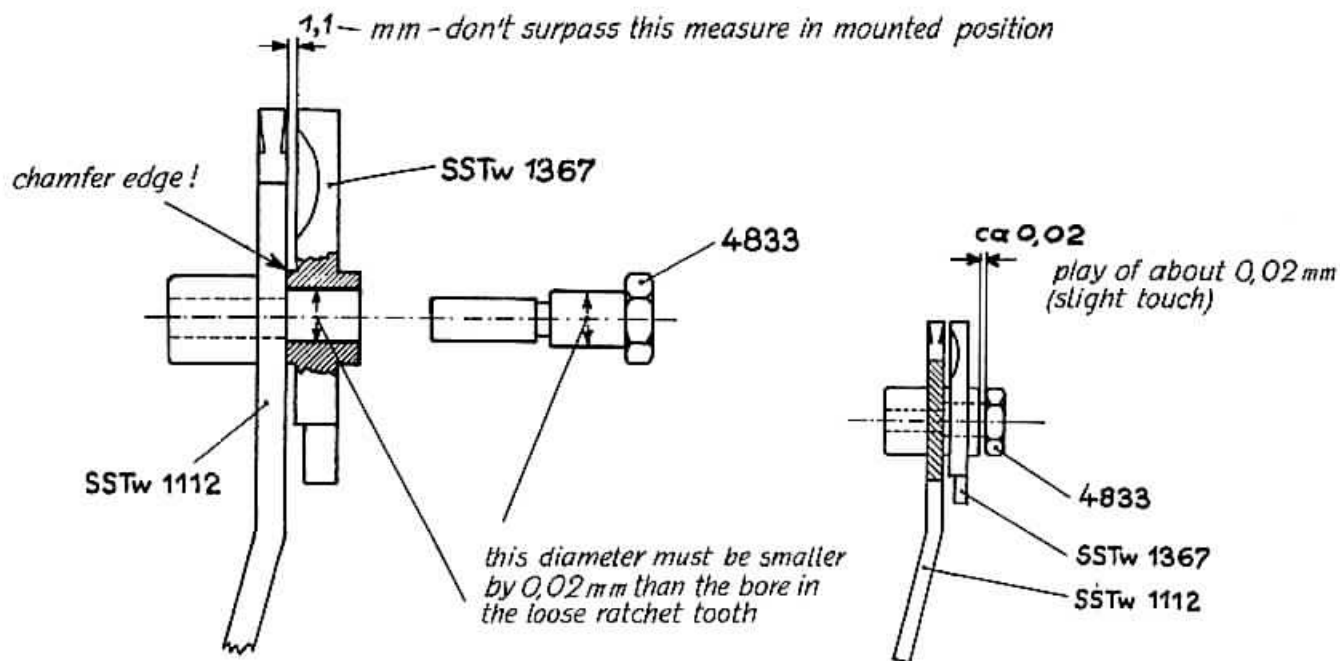
- 1) Break sharp edge of lower hub on loose escapement tooth SStw 1367 with oil rubber.

ESCAPEMENT: CARRIAGE DOES NOT MOVE

Group: Frame

- 2) Smooth any possible flutes in the escapement tooth bearing surface on the escapement with whetstone (remove cadmium).
- 3) Fit crank pin with free movement (0,02 mm. air) into escapement. If necessary polish the running surface of crank pin 4833 with polishing cloth i.e. smooth it.
- 4) Replace escapement tooth SSTw 1367 with play which can be slightly felt between escapement and crank pin head, as well as slight shaft play into escapement.
- 5) Please attend to the fact that the compression spring 5610 in the stop bolt and the draw spring 5656 are in the same proportion with regard to the tension.

If the repairing works of cause 1) and of cause 2) cannot be executed, please send the escapement to our works and don't forget to indicate the work number of the machine.



In as far as repairs under faults 1 and 2 cannot be carried out or it is found that the fault cannot be remedied escapement should be sent to us for exchange, indicating the number of Machine.

III

A D J U S T M E N T

Necessary tools:

2 spanner RW 68 6 mm = s
1 short screw driver RW 81 5 x 0,6

In order to carry out these repairs it is necessary to remove the back of the typewriter outer frame.

1) Examination of normal position (left margin)

Examination of the left margin is carried out by setting the machine on position "0" on paper bail. The left margin stop SSTa 3148 is pushed to the end limit on the left and the carriage run to stop block STa 1078. Careful attention should be paid to see that the O-mark on paper bail is in the centre of the letter. Then the distance between the lug of the left margin stop SSTa 3148 and the stop block STa 1078 is examined. This distance must lie between 1,6 and 2 mm. If this measurement is exceeded or not reached, the margin stop rack must be loosened on both sides and adjusted accordingly.

2) Examination of right margin

In order to examine the right margin position, margin stop SSTa 3147 is pushed on the margin stop rack up to the right stop (division 80 on scale), and the carriage is run to its end limit on the left. Now it is possible to see whether there is sufficient clearance between the stop nose of the margin stop and the stop block STa 1078, or whether the stop block has already been moved a short distance. In this position, the stop nose may only be 0,4 mm away from the stop block. It is better if the nose pushes the stop block along the same distance. A pre-requisite for insertion of the margin stop is that when the carriage makes its next movement, the stop block STa 1078 is pushed forward a whole space. If the distance from the stop nose of the margin stop to the stop block is more than 0,4 mm when the carriage is on division 79, then the stop block is only pushed forward 2 mm during the following motion of the stop block. This distance, however, does not suffice to enable the stop rail to be inserted completely and with safety.

Furthermore, attention should be paid to the following:-

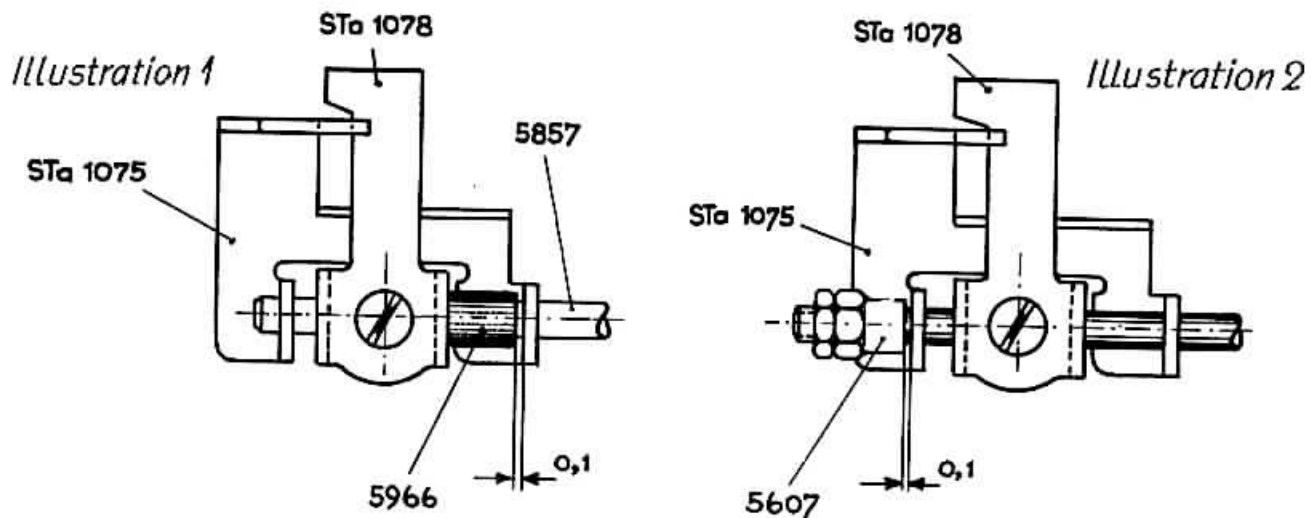
a) For older models:

When the carriage is at division 80, i.e. after insertion of the line lock, there must be a clearance of at least 0,1 mm between the spacer 5966 seated on shaft 5857 and the uncoiled flap of the end stop STa 1075 or STa 1078. (See illustration 1)

b) On newer models:

When the carriage is at division 80, i.e. after insertion of the line lock, there must be a clearance of 0,1 mm between the collar nut 5607 seated on the end of shaft 5857 and the uncoiled flap on the end stop STa 1075. (See Illustration 2.)

The clearance suggested in a) and b) is necessary in order to sufficiently safeguard against jamming.



3) Examination of functioning of key lever lock slide arm STa 1046.

It is necessary to run the carriage as far to the left as possible so that it stops at division 79. By moving the carriage from division 79 to division 80, the lug of the margin stop presses against stop block 1078 on shaft 5857; pressure lever STa 1079 lying on the same shaft rests against pressure lever STa 1033, swings it to the left and thereby makes the key lever STa 1033, swings it to the left and thereby makes the key lever slide arm STa 1046 ready for insertion. To be on the safe side, it must be possible to swing the pressure lever a further 0,3 to 0,5 mm (approximately) in this position, so that when reversing the carriage no rubbing (scheuer) or tension occurs, whereby stop block STa 1079 can be pushed to the rear or unswivelled through the reversing motion, which would lead to automatic disconnecting of the lock.

When locked, all key levers are sharply tapped in order to ascertain whether they are correctly caught up by the rack.

When unlocked, the lock slide arm, together with its connecting rod, should be examined up to pressure lever STa 1035, in order to find out whether it moves easily, and any faults must be adjusted.

4) Examination of end lock

After unlocking the margin stop on the right margin, the end of the machine is reached after a few taps. This end lock is caused by placing the head of the cylinder screw at the end of the rear prism of the carriage main plate. This screw head rests against end stop STa 1075. After the end lock has been reached, the carriage release lever SSTw 3117 should be depressed and it should be observed whether the switch to operate the carriage free-wheel can be switched through. This is only possible if the last step was made immediately before at least half the end stop occurred, and therefore the fixed dog of the switch could slide through the tooth-space of the ratchet wheel. If, when carrying out this examination it is ascertained that the fixed dog of the switch touches a tooth on the ratchet wheel, then the cylinder head of the end limit screw must be filed off a little, so that the minimum measurement (half switch space) is reached.

DISMANTLING, ASSEMBLING AND ADJUSTMENT OF
ESCAPEMENT SSTa 1126 and SSTw 1126

Group: Frame

Necessary tools:

1 short screw driver	5 x 0,6	RW 81
1 short screw driver	8 x 0,8	RW 81
1 Watchmaker's screw driver	8d/W Schr 21	
1 spanner	6 mm = s and 7 mm = s	RW 68
1 spanner	4,5 mm = s	RW 67
	width of 4,05 to be widened 4,5	
1 side cutter	8d/WZ 64	
1 Round tong		RW 55
1 socket wrench	5 mm = s 8d/W Schr	191
1 spring hook		RW 56
1 three-sided grinding file	8c/W Schr L 88	

To begin with, it should be mentioned that 2 types of escapement must be considered. Escapement type SSTa 1126 was built into all SM 1 typewriters and also into a number of SM 2 machines. These machines are also described as "being fitted with the old lever-play system (Hebelspiel)". The second type of escapement, SSTw 1126, has only been built into SM 2 machines are described as being fitted with "the new lever-play system". The latter construction has a 50% preswitch ("Vorschaltung"). More detailed information with regard to the differences in both types of escapement will be given below. Without looking at the escapement itself, there is a very easy way of ascertaining whether a typewriter is fitted with the old lever-play system; namely, that all machines fitted with the old lever-play system have a type lever with beads, whereas machines with the new lever-play system are fitted with key-levers without beads. Escapements SSTw 1126 can, if it should be necessary to exchange the escapement, be used only in machines possessing the new lever-play system, as on these machines the mechanism is built according to the 50% pre-switch. If this escapement were built into machines having the old type of lever-play system, then one would have to expect the letters to rub if typing slowly on the machine.

The main differences between escapement SSTa 1126 and escapement SSTw 1126 are:-

1) Forcing lever:

The control crank of forcing lever SSTa 1126 of escapement SSTa 1126 has a width of 4,24 mm wide at its widest point. The control crank of forcing lever SSTw 1126 has a width of 3,94 mm at its widest point.

2) Loose Escapement tooth:

The loose escapement tooth SSTa 1367 of escapement SSTa 1126 has a wide surface on the side lying opposite to the release plate. The loose escapement tooth SSTw 1367 of escapement SSTw 1126 has a narrow surface on the side lying opposite the release plate.

3) Escapement Wheel:

The teeth of escapement wheel SSTa 1109a of the escapement SSTa 1126 are relief-ground on both sides. The teeth of escapement wheel SSTw 1109a of escapement SSTw 1126 are only relief-ground on the rear side of the tooth, in front it is therefore level "plan".

4) Escapement frame:

On escapement frame SSTa 1112 of escapement SSTa 1126 the front edge of the fixed dog runs absolutely perpendicular, the pivot of the loose escapement dog SSTa 1367 lies 1,5 mm.

DISMANTLING, ASSEMBLING AND ADJUSTMENT OF
ESCAPEMENT SSTa 1126 and SSTw 1126.

Group: Frame

alongside this edge. This escapement frame only has a blade spring of a width of 0,3 mm. thickness. On the escapement frame SSTw 1112 of escapement SSTw 1126 the inside edge of the stepping escapement tooth runs askew towards the inside in an angle of 5,5 degrees. Furthermore the stationary escapement dog is more pointed and narrower. The pivot for the loose escapement dog SSTw 1367 lies 0,4 mm. next to the stationary tooth edge (up to the point of the tooth in the soldering). Furthermore spring nests can be used on escapement frame SSTw 1112. Each spring nest contain 12 laminated springs of 0,1 mm. thickness each.

- 5) Distance between loose and stepping escapement dog:
This distance is 0,7 mm - 0,1 mm. on escapement SSTa 1126.
On escapement SSTw 1126 this distance is 1,3 - 0,05.

A. Dismantling of escapement

- 1) Take machine out of the outer frame, after the carriage has been removed (see instructions as to overhaul No. 1/1 and 1/2)
- 2) Take escapement out of machine.
- 3) Remove escapement frame by loosening of the left point screw 4719 with nut 5253. Please be sure that only the left point screw 4719 of escapement frame is loosened, unless there is absolute necessity to do otherwise, in order that the indexing position of the escapement frame to the centre of the escapement wheel is maintained. This is given by the bearing of the escapement frame at the point of the right pointed screw 5156. Please also take care that when removing the escapement frame the disc between escapement frame and forcing lever is not lost.
- 4) Now according to the work to be carried out, the loose escapement dog SSTa 1367 or SSTw 1367 is removed out of the escapement frame by loosening both eye-bolts 5144 and bearing screws 4833 are pushed out. (This pushing out is necessary as the eye-bolts at their point of impression in bearing screw 4833 have possibly been raised to a slight degree.)
The necessary repairs can thus be carried out on the escapement frame or loose escapement dog.
The removal of any possible faults on the escapement known up to now, will be described separately in a subsequent Manual.
- 5) Removal of escapement wheel SSTa 1109a or SSTw 1109a takes place by loosening nut 5203 and removal of bearing screw 4828. When fitting in a new escapement wheel, care must be taken that the slip ring spring STa 1344 is placed in the correct position and the escapement wheel is properly seated. More detailed instructions will be given in the next Manual.

B. Replacing

When replacing any parts which have been exchanged into the escapement, the greatest care must be taken that only those parts are put back into the escapement SSTa 1126 which are intended for this type of escapement. The mistaking of any spare parts which belong to escapement SSTw 1126 can lead to new faults.

DISMANTLING, ASSEMBLING AND ADJUSTMENT
OF ESCAPEMENT SSTa 1126 and SSTw 1126.

Group: Frame

The same of course applies to parts of escapement SSTw 1126 when repairing.

Before replacing, all parts of the escapement are washed in clean petrol. Especial care must be taken that the drillings of loose escapement dog, escapement wheel and the head surface of bearing screw are perfectly clean. The escapement frame itself, on account of the layer of grease in the spring nest, must not be washed in petrol but the surface and the bearing points within the escapement should each be cleansed separately.

Now the loose escapement dog, together with a new bearing screw, are together built into the frame of the escapement. Before doing so, one should make sure that the escapement dog on the crank pin 4833 runs perfectly smoothly by examining whether the escapement tooth falls of its own accord to its centre of gravity. It is not advisable to use the old bearing screw as possibly impressions produced by the eyelet prevent fine adjustment. The eyelets are only tightened after the final adjustment. The old escapement dog can only be replaced when its chief functioning surface are in perfect condition. As such, must be regarded: the polished starting surface, the polished rounded part of this surface at the tip of the tooth and its starting edge and also the bearing hole with its running surfaces. Adjustment of the loose escapement dog can take place after replacing into the escapement frame has been carried out. For this purpose, the crank pin 4833 is turned clockwise until the loose escapement dog moves from above into its final position. The loose escapement dog should when working position (when stop surface lies against the laminated spring, i.e., on the spring nest) stand 0,3 mm on escapement SSTa 1126 and 2,8 mm on escapement SSTw 1126 in front of front edge of stationary escapement dog measured from the highest point of the fixed escapement dog. When this measurement is reached, the axial play of loose escapement dog should be tested, which should only be slightly felt. The eyelets 5154 are now tightened. The axial play must not thereby, of course, be altered. The bearing point of the escapement tooth is then oiled with a drop of paraffin oil.

Illustration 1 shows the distance of the front edge of loose escapement tooth to the front edge of fixed escapement dog in working position.

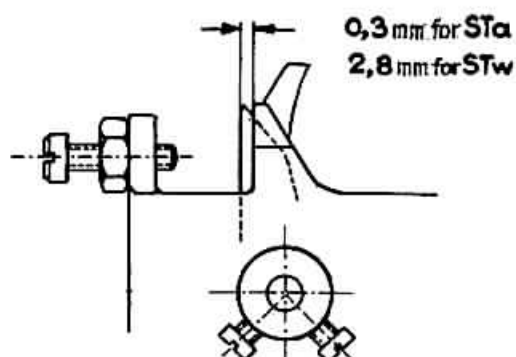
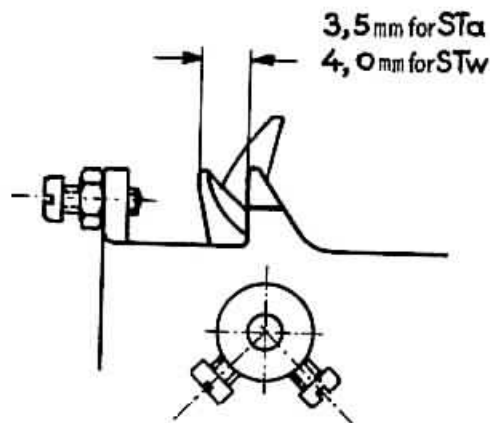


Illustration 2 shows the distance of the front edge loose escapement tooth to front edge stationary escapement tooth in normal position.

DISMANTLING, ASSEMBLING AND ADJUSTMENT OF
ESCAPEMENT SSTa 1126 and SSTw 1126.

Group: Frame



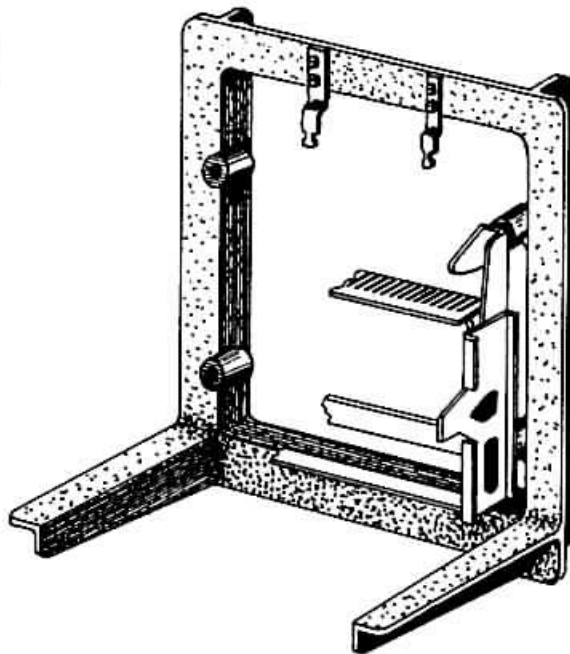
The frame of the escapement is built in between both pointed screws 5156 and 4719 in such manner, that it has no play whatsoever in the direction of both these pointed screws, but nevertheless by itself falls to the side of the centre of gravity.

When replacing the escapement into the machine, care should be taken that after it is screwed tight on to the rear carriage rail, the frame of the escapement also fits perfectly. Care should be taken that the surfaces are clean, as the slightest bit of dirt in connection with uneven tightening of the screws can possibly result in the escapement being distorted and therefore the above described instructions for replacing of the escapement can no longer be guaranteed.

Furthermore care should be taken that the first described frame of the escapement is brought back by a draw spring 5668, whereas the motion of bringing back of the escapement body of the second type of escapement takes place by means of a pressure spring 5612.

IV
ADDITIONAL TOOLS

After a machine has been taken out of its outer frame, it is advisable, if difficult repairs are to be carried out or if parts are to be exchanged, to use assembling frame RW 32 (see following Illustration 1 and 2). The machine is screwed on to this frame and thus has an increased stability, which is also guaranteed by the steel frame, which is so essential for construction-purposes.

Illustration 1*Illustration 2*