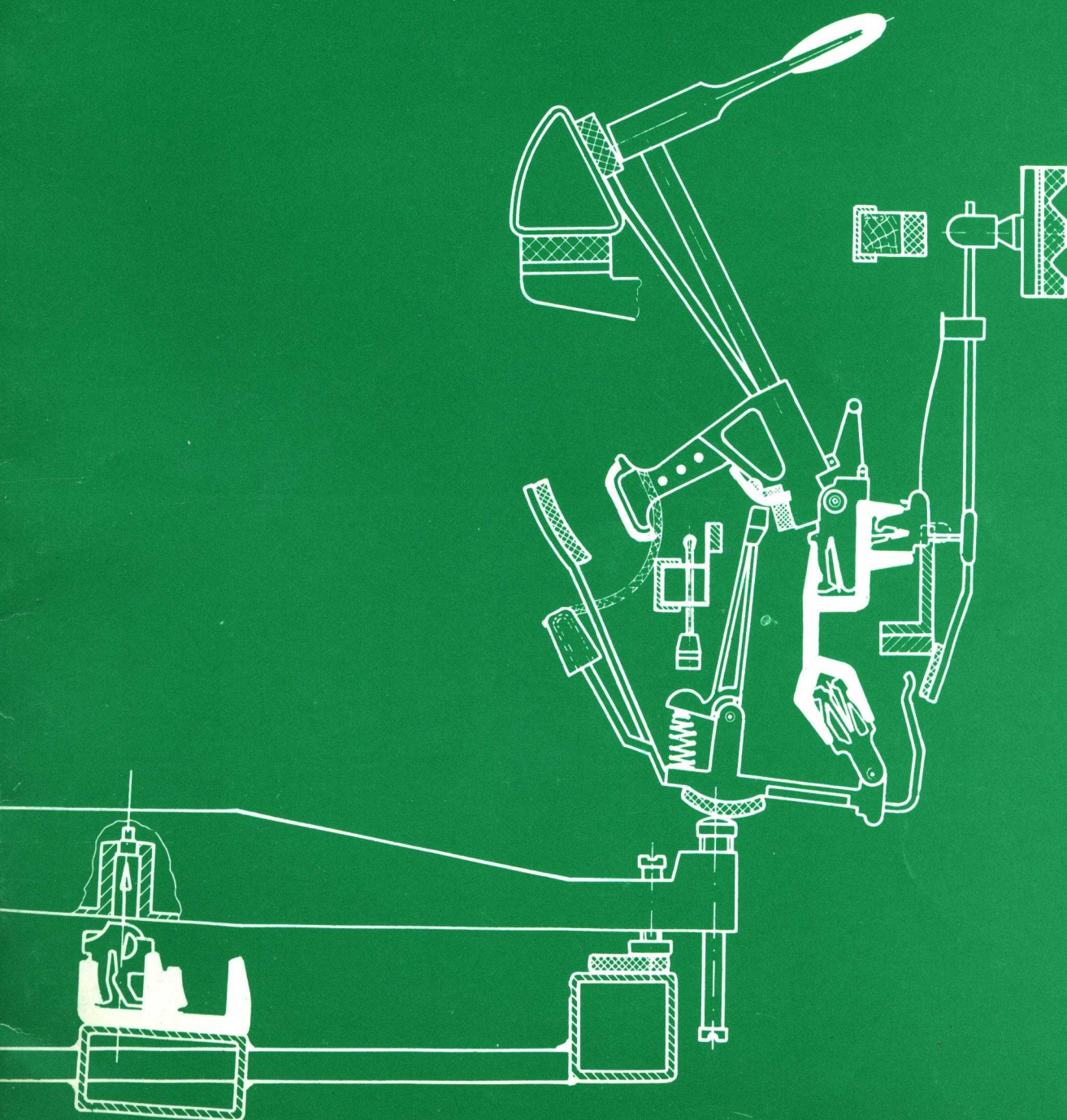


LINDNER

technical manual



LINDNER

piano technical manual

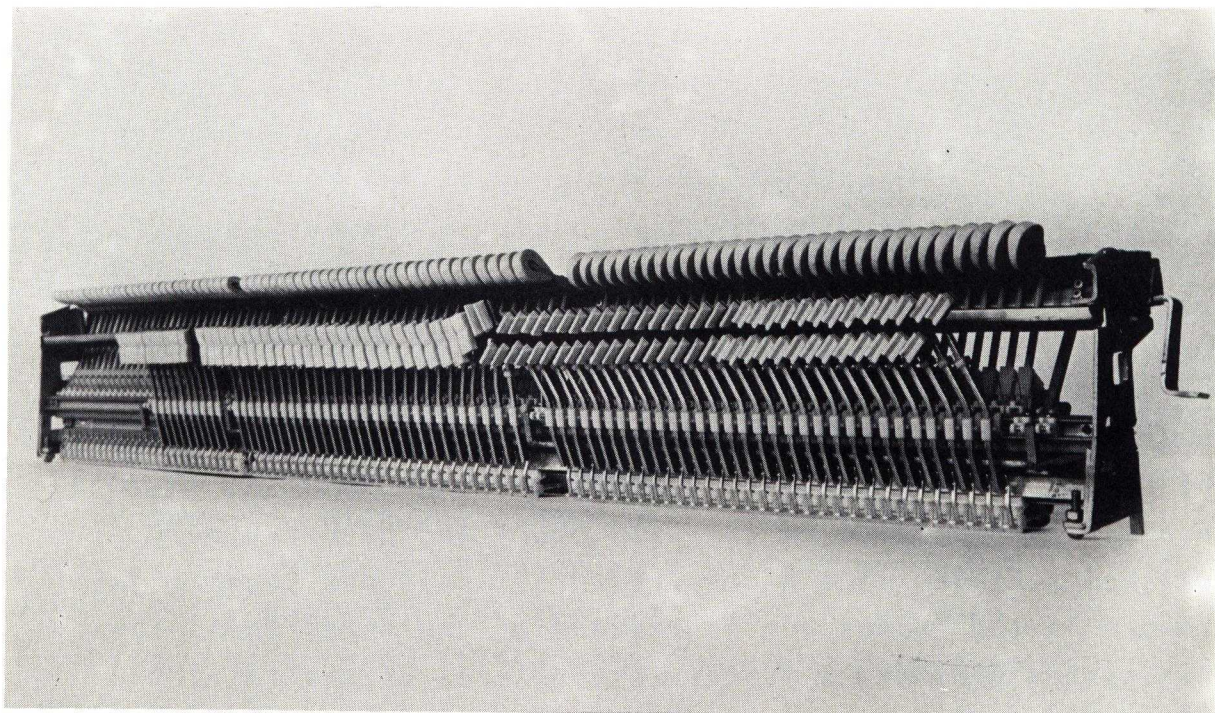
This extensive service manual has been compiled to help piano technicians and tuners, all over the world, in understanding the construction of the Lindner Piano, and as a guide for servicing. It contains a description of the main technical details and has been worded in such a way that it can be understood by a layman interested in technical matters.

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action



picture 1

In order to be able to work with the precision engineering materials of to-day, the Lindner action had to be of a completely new design. It would not be enough to substitute a wooden part by a plastic part of the same construction. New materials ask for new constructions, using the advantages of the materials to the maximum degree.

All rails, including the action beam, the damper slap-rail, the set-off rail, and the hammer rest rail, are made of hard drawn aluminium to a very close tolerance. These rails in contrast to wooden rails, will never warp or shrink. The vital parts like hammer flanges, and jacks are made of a tough low-friction thermoplastic of the acetal range. By using this material the following advantages are obtained:

- (a) cloth bushings, which can swell and wear, are not required, and the parts will not stick even in tropical climates.
- (b) a special graphite coating on the top of the jack is no longer necessary, because of the low friction properties of the material itself.

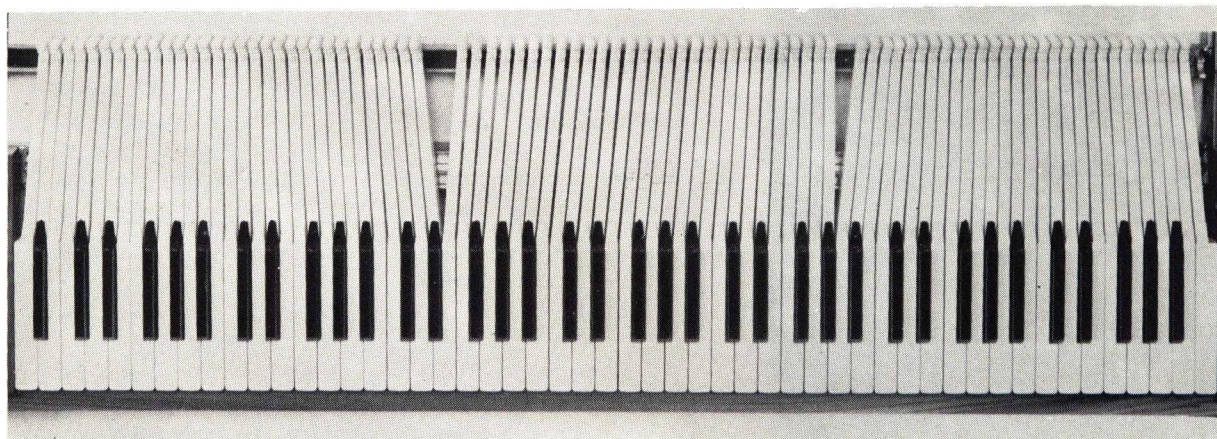
- (c) the flanges can be fastened to the action beam by a snap-fit method which is not affected by any climatic conditions, contrary to wooden flanges, which are screwed and can work loose. Also the flanges align the hammers automatically for travelling straight.

The Lindner centre pins are manufactured of stainless steel to an accuracy of 2/1000 mm (or 1/10,000") and have a highly polished surface. The hammer rest rail does not support the hammers on the shanks but on the end of the heads themselves. This system provides a larger resting area on the felt, reducing the penetration of the part into the felt which would necessitate re-regulating. In order to reduce friction and wear of the hammer rest felt, as in old type piano's, the hinge point of the rest rail in the Lindner piano has been designed to coincide with the hinge point of the hammers, so that movement of the head over the felt is eliminated.

Dampers are made of aluminium with an integrally moulded acetal hinge. By doing away with centre pins in the dampers, the problems of noisy or sticking dampers have been eliminated. The plastic material used for the butts is tough enough for applications like crash helmets and car bodies, and the covering material is no longer doe skin, but a hard wearing, non-hardening nylon surface on a jersey backing.

The results of all these improvements are stable and faster regulation, faster repetition, and trouble free operation.

keyboard



picture 2

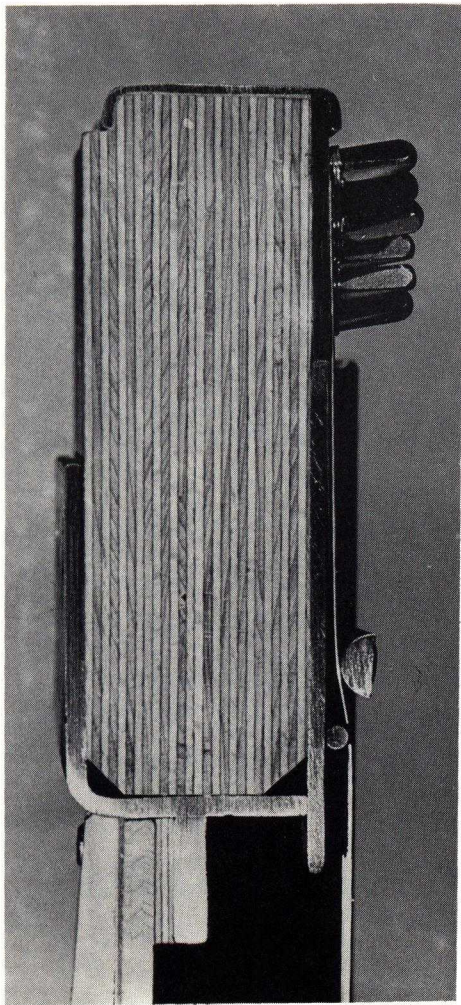
To-day very few pianos are made with ivory or celluloid coverings on the keys. Already more than 30 years ago RIPPEN N.V., Holland, made keys with acrylic perspex coverings, because of its superior wear and yellowing resistance. In a logical development of this moldable material, Lindner makes the complete key from it, resulting in the following advantages:

- (a) The keys are very light and do not require lead in the back to make them fall back. Lead gives mass-inertia and results in slow response.
- (b) In these light keys a spring can be used to return them, and this works faster than the mass of wooden keys.
- (c) Because the keys are a one piece moulding, they do not discolour, and the sides are easy to clean.

Lindner keys have a special low friction plastic bushing instead of the one made of cloth. The bushing is not affected by moisture and cannot cause jamming (sticking). The batpin itself is fitted with a Teflon® sleeve, in order to reduce friction even further. Teflon® is a very expensive plastic material with a co-efficient of friction as low as wet ice on wet ice.

To make regulating (of the keys) as easy as possible, Lindner keys are made with adjustable screws. No paper washers are used and no removal of keys is necessary. The keys are regulated fast and accurately with the screws.

frame and soundboard



picture 3

Another Lindner feature is the frame. Cast iron frames have many disadvantages. Although they are rigid and normally strong enough to carry the tension of the strings, cast iron frames can crack and cannot be made to very close tolerances.

Lindner developed a frame which can be made accurately, economically and with superior strength. The frame is welded together from high tension tubular steel.

High tension tubular steel profiles are cut to length and welded together to form a stable and unbreakable frame. This frame contracts and expands with temperature changes in accordance with the strings, thus minimising the influence of temperature on tuning stability. The best makes of tuning pins and steel and copper wires are used.

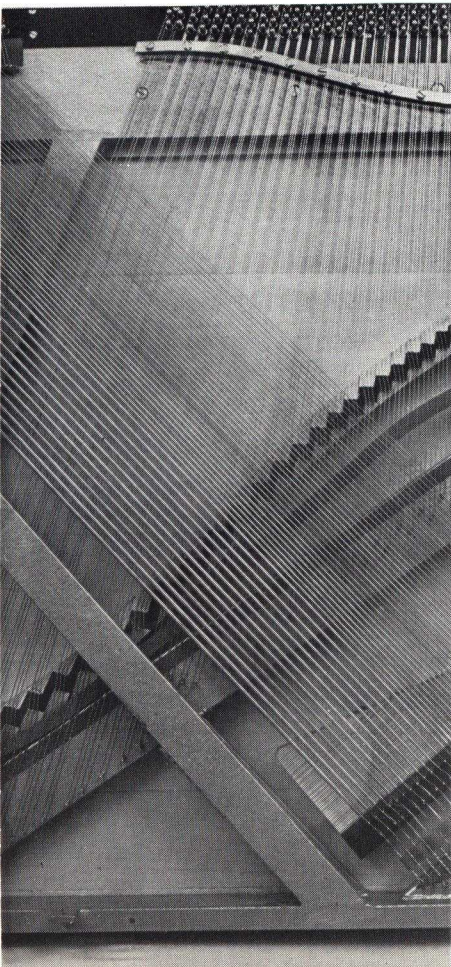
The Lindner wrest plank (pin block) is laminated with 28 layers of selected beech. Pianos were first made with one block of wood, which later changed to several layers, but this could not always completely prevent splitting. With the 28 layers of cross-laminated beech this problem is eliminated and the pins are held tighter and more solidly.

In many old pianos the wrest pins have bent down from the constant tension of the strings. This can be seen by the opening between the wrest pin and its bushing (dowels). To overcome this problem Lindner have made the string pulling at the wrest pin as close as possible to the pin block, avoiding any leverage on the pin, and the pins go directly into the wrestplank, without going through a bushing.

For this purpose the wrest pins are made with a left-hand thread, so as to have the string lying against the wrest-plank, and the coils in front of it. With every clockwise full turn, the pin comes out of the pinblock just so far as to allow a further coil to be formed.

The difference in the direction of the thread does not change the manner of tuning. It improves the tuning stability. When tuning a Lindner piano, a slight difference in "feeling" will be experienced because the wrest pins do not bend as in conventional pianos.

picture 4



The sounding boards of most pianos are, like any other wooden products, affected by differences in temperature and humidity. These sounding boards often loose their tension, and even split. The Lindner "Permatone" sounding board is made from several layers of finest spruce, resulting in a board that keeps its shape and will not split, even under the most extreme conditions including central heating. This claim is backed up by a 75 Year Guarantee against splitting.

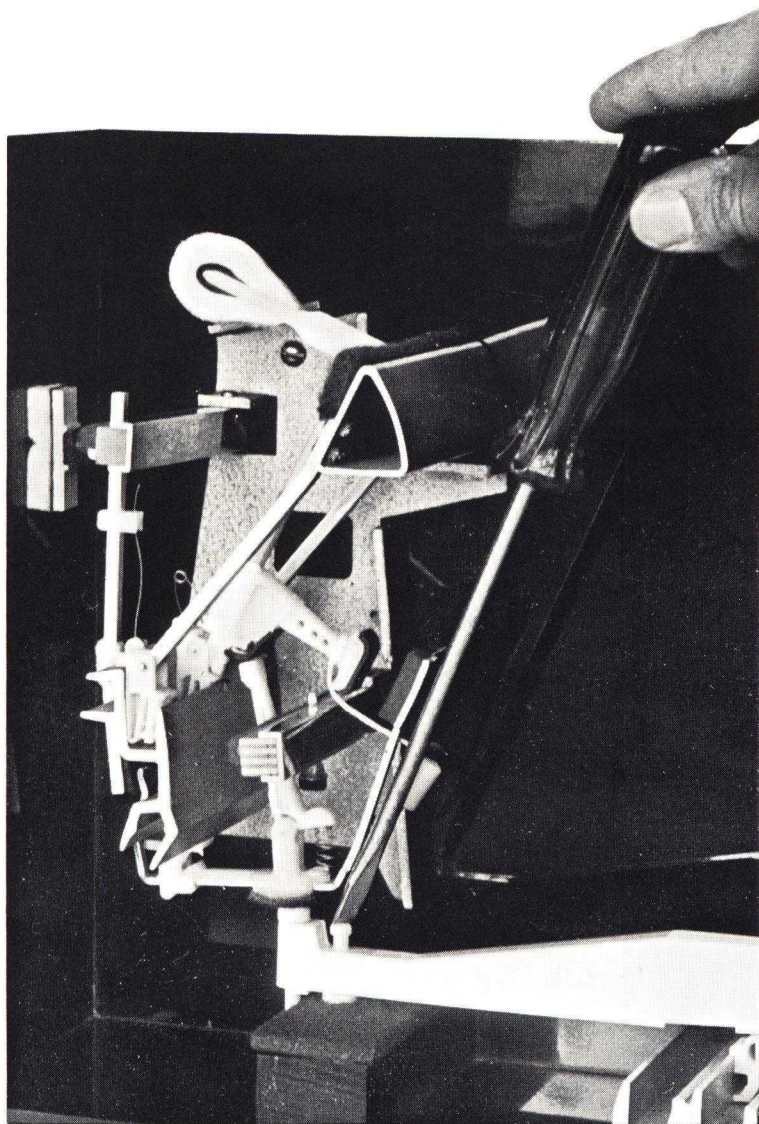
pedals



picture 5

The pedals can easily be removed and fitted in their plastic snap-fit hinge points. Squeeks are eliminated. Adjustment of the pedal rods is fast and easy with an adjusting bolt directly under the rod. To adjust, loosen the lock nut of the adjusting bolt, turn the rod up or down, as required, and fasten the lock nut again. Care should be taken to ensure that the end lever of the pedal rocker is seated properly in its guide under the pedal.

regulating

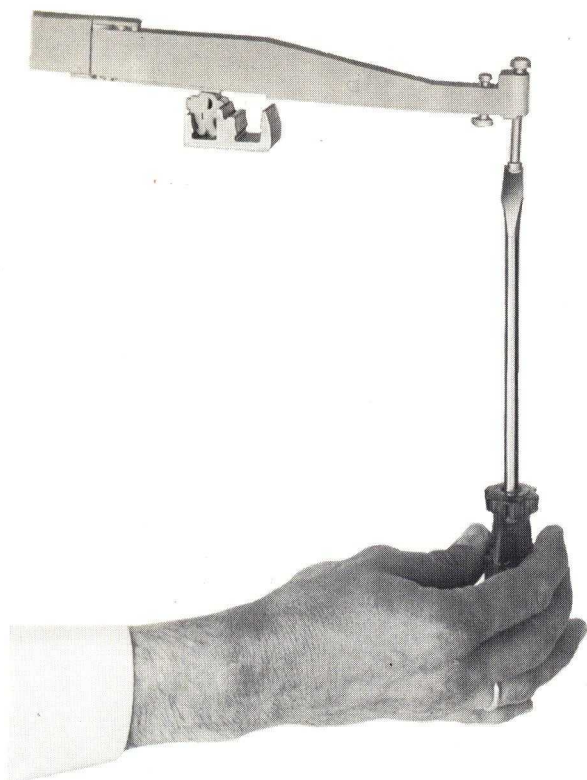


picture 6

When studying the Lindner piano, any technician will see straight away that the regulation of the action and keyboard does not differ a great deal from that of the conventional piano. It is just much simpler, and quicker.

regulating the keyboard

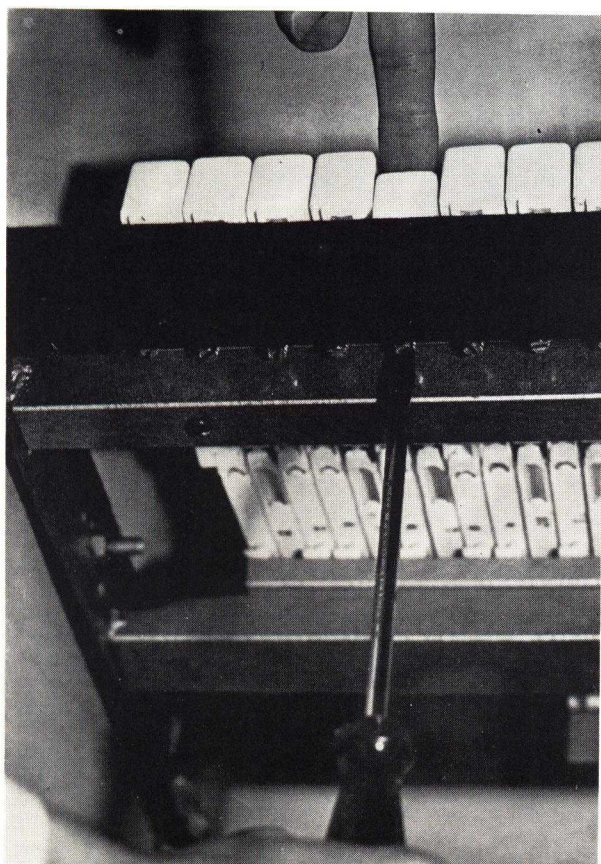
Key Level: The level of the keys can be adjusted with the screws at the rear end of the keys. By turning the screw clockwise, the front of the key will come down and vice versa.



Capstan Screws: These can be adjusted simply with the use of a screwdriver, from underneath the keys. It is advised to leave a little "play" between jack and notch.

picture 7

picture 8



Depth of touch: Keystroke can be adjusted by turning the screws underneath the front of the keys. The proper average depth of touch is $\frac{3}{8}$ " (10 mm).

regulation of the action

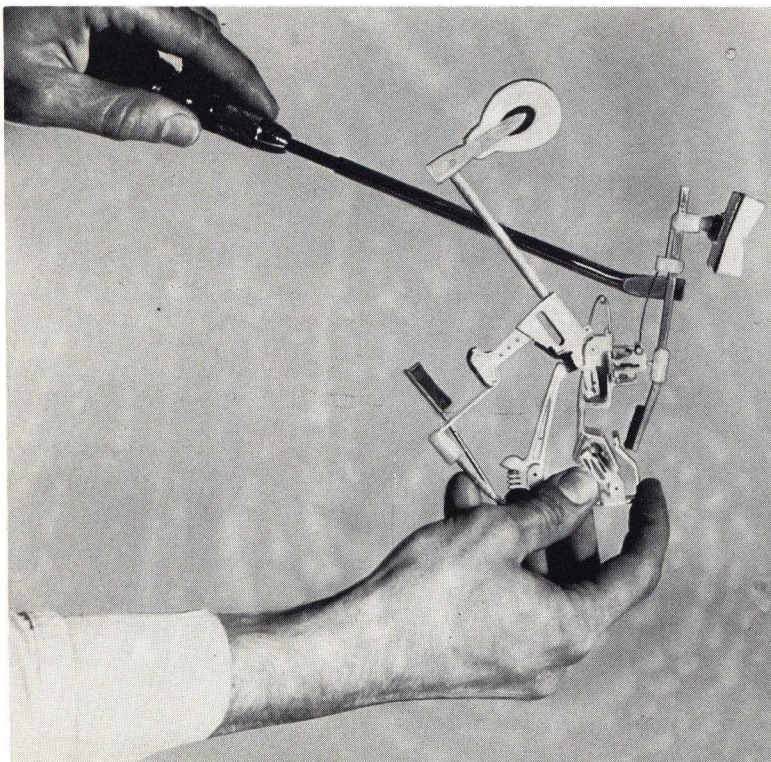
The main dimensions for the action regulation are as follows:

			<u>Treble</u>		<u>Bass.</u>
Stroke of hammer	1 3/4"	-	45 mm	-	50 mm
Set-off	1/8"	-	2 mm	-	3 mm
Catch or check	1/2"-5/8"	-	13 mm	-	16 mm
Damperlift	1/4"	-	6.5 mm maximum		

Checking: or Catch:

The checking is adjusted by bending the (Aluminium) lever the same as would be done in all other pianos.

picture 9



Damperlift:

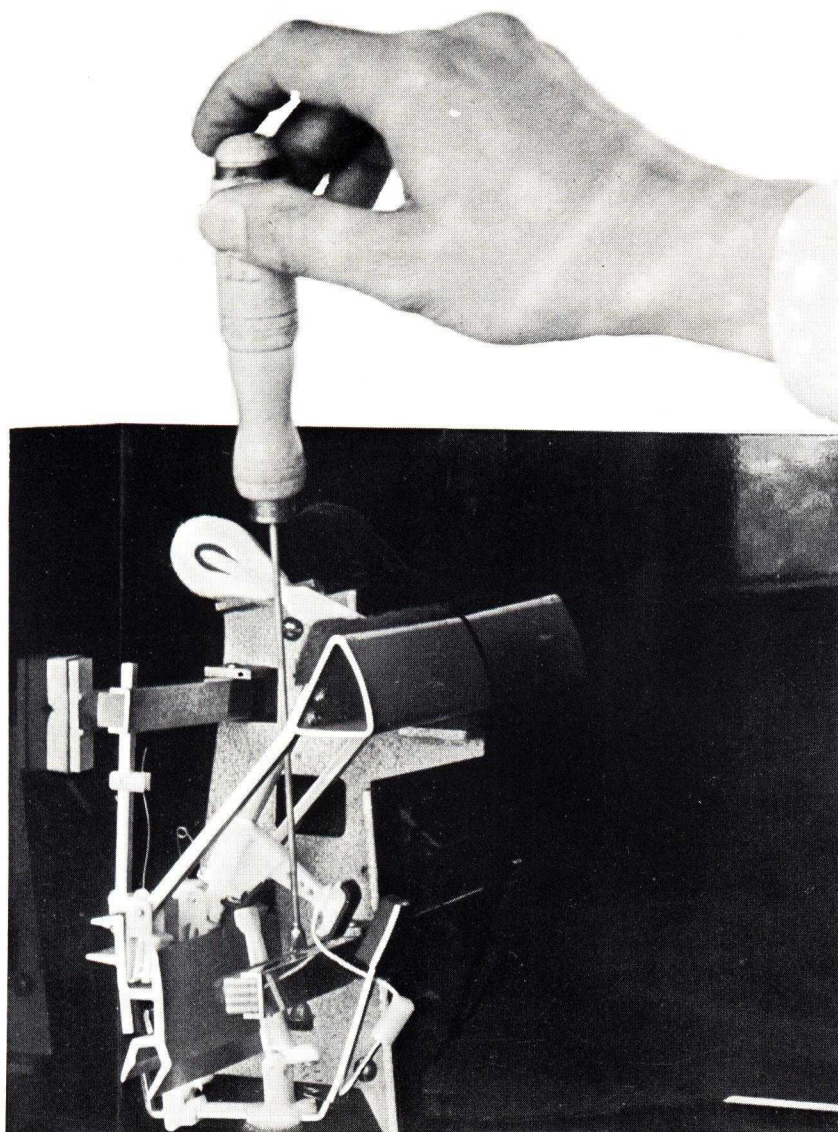
For regulating the damperlift, Lindner have a special tool, which is available on request.

However, for occasional adjustment of single dampers, a normal pair of pliers can be used, but the action then has to be tilted back. (9)

set-off

The adjustment of the set-off is on the same principle as all pianos. (10)

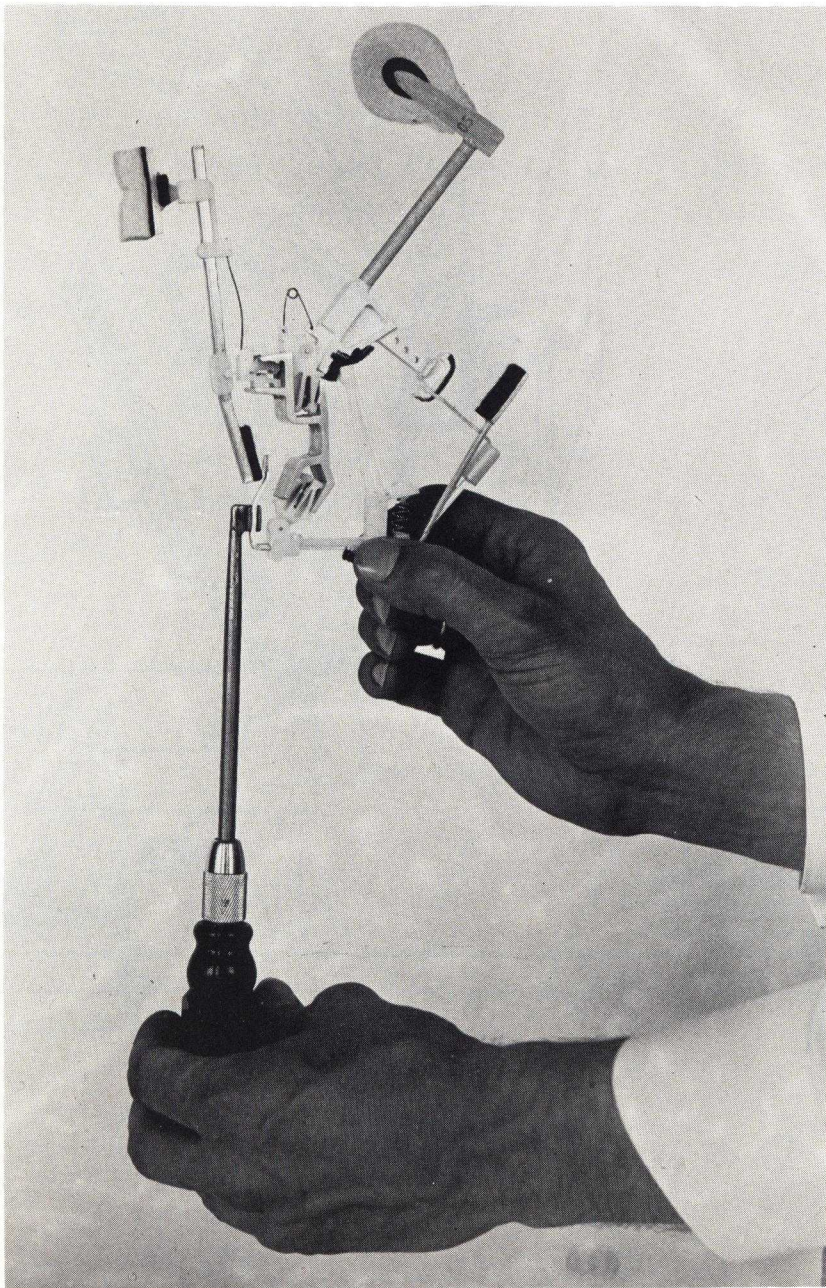
picture 10

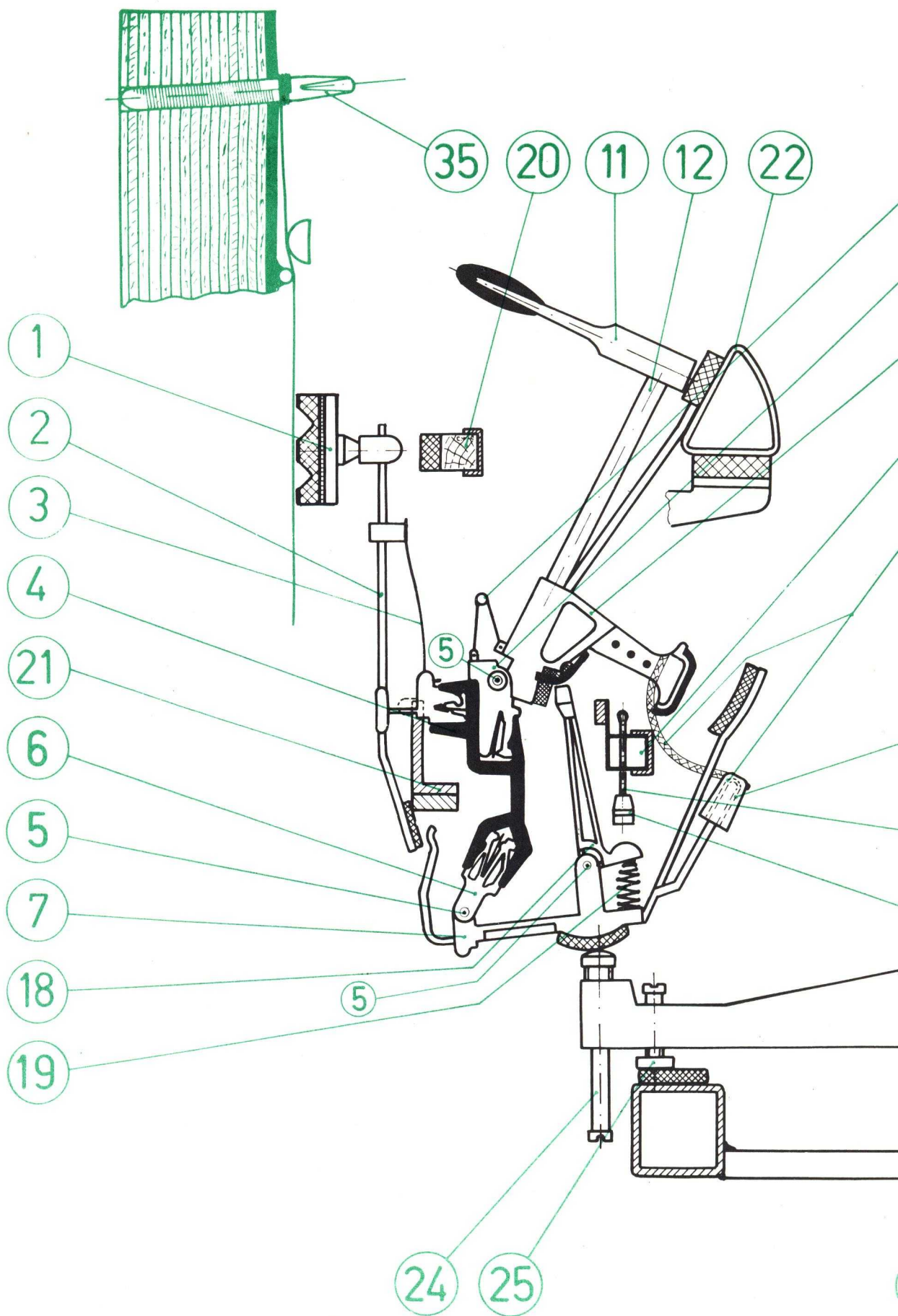


spoon adjustment or half blow

The spoons can be adjusted with an ordinary slotted tool with the action tilted back, or with the special Lindner tool. With this tool the action can be left in position and the spoon can be adjusted from underneath. (11)

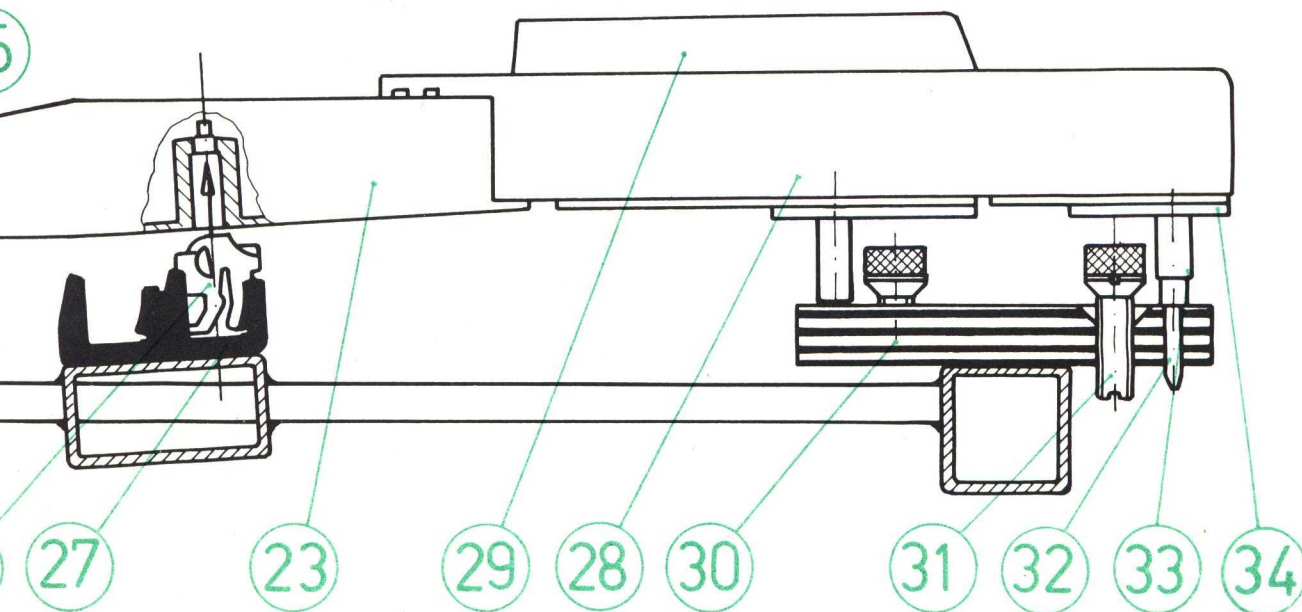
picture 11





Partslist

- | | |
|-------------------------------------------------------------|--------------------------------------------------------------------------|
| 1a. Damperhead Bass (clip). | 18. Jack (fly). |
| 1b. Damperhead Bass (wedge). | 19. Jack return spring. |
| 1c. Damperhead Treble. | 20. Damper slap rail. |
| 2a. Damper arm assembly Bass. | 21. Damper lift rail. |
| 2b. " " " Treble. | 22. Hammer rest rail. |
| 3a. " Spring bass. | 23. Back key. |
| 3b. " Spring Treble. | 24. Capstan screw. |
| 4. Action beam. | 25. Level screw. |
| 5. Centre pin. | 26. Key flange assembly. |
| 6. Lever flange. | 27. Balance rail. |
| 7. Lever assembly (incorporating 6.18 and 19.)
(Whippen) | 28. Front key. |
| 8. Repetition spring. | 29. Sharp key. |
| 9. Hammer butt flange. | 30. Bat pin rail. |
| 10. Hammer butt assembly
(incorporating 8 and 9). | 31. Depth screw. |
| 11. Hammer. | 32. Batpin. |
| 12. Hammer shank. | 33. Bat pin sleeve. |
| 13. Set-off rail. | 34. Key guide bushing. |
| 14. Set-off screw. | 35a. Wrestpins (tuning pins)
6.75 mm x 57 reverse
thread - blue. |
| 15. Set-off button with pad. | 35b. Wrestpins (tuning pins)
6.75 mm x 57 reverse
thread - plated. |
| 16. Lever nipple. | |
| 17. Butt nipple and cord. | |



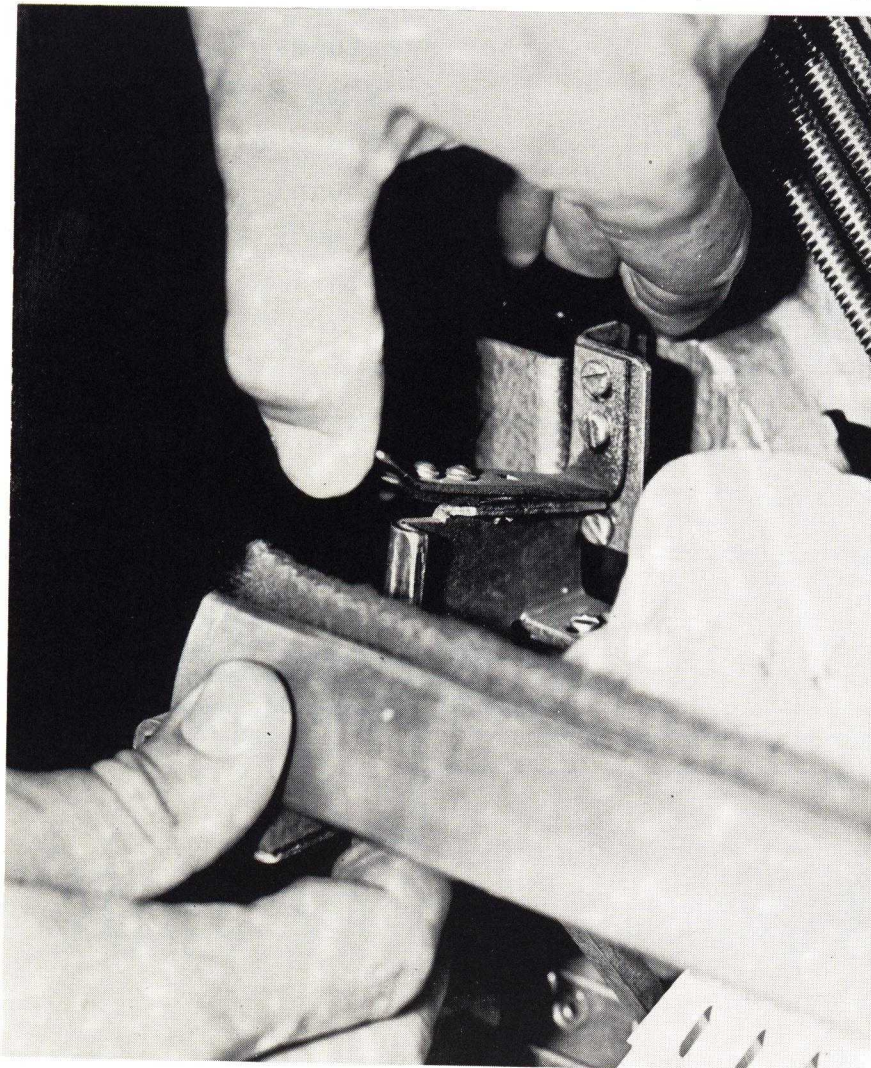
repairs and replacement of parts

The parts of action and keyboard of all Lindner models are interchangeable. Centre pins can be replaced, but to save costly time it is advisable to exchange a complete part.

Felts can be replaced with glue containing acetone, or any impact glue.

removal of action

picture 12

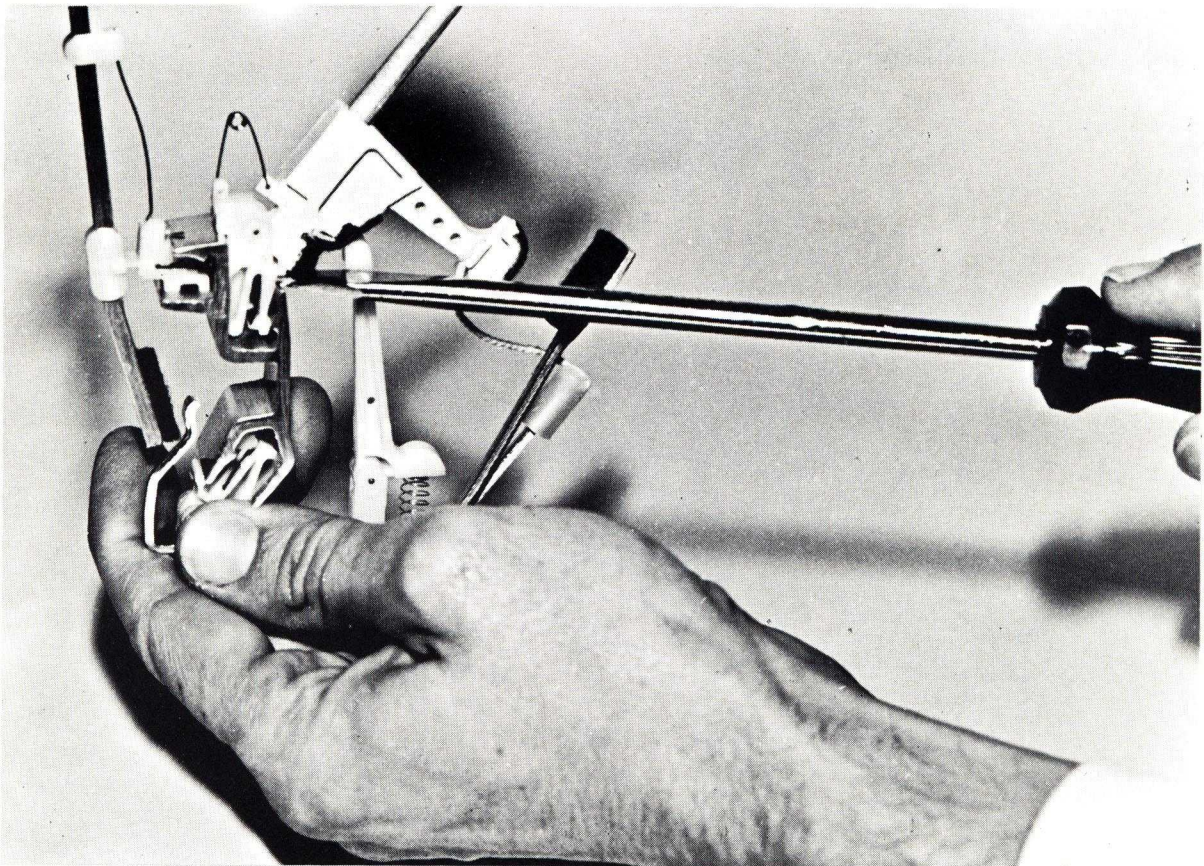


Lift the clips located at each end of the action, and pull the top of the action backwards, then lift out. For fitting the action, locate the rear legs of the action standards in their locating brackets, and swing the top of the action forward under the clips until the clips snap into position.(12)

repairs and replacement of parts exchanging a butt

Exchanging a butt: (13) Remove bridle-tape cap from the spur, by pulling it up gently (see picture 15). Place screwdriver between the protruding lip of the flange and the action beam. Twist the screwdriver and the flange will pop up.

picture 13



Note: Hammer shanks can be glued into a butt with a glue containing acetone as solvent.

repairs and replacement of parts exchanging a butt (cont.)

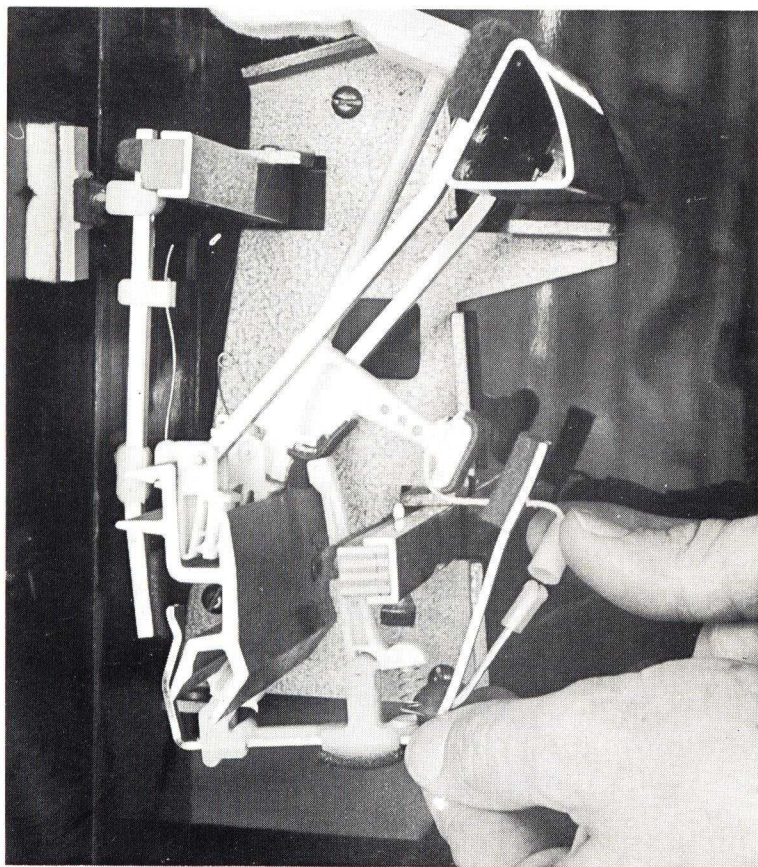
Exchanging a butt (continued): Push the new butt into the rail (keep back the jack, to leave room for the butt to come down) and press down fully with a screwdriver on the top of the flange, until it snaps into position. (14) Re-connect the bridle-tape cap. Spacing can be adjusted by sliding the flange sideways in the rail with the aid of a screwdriver.

picture 14



exchanging a lever

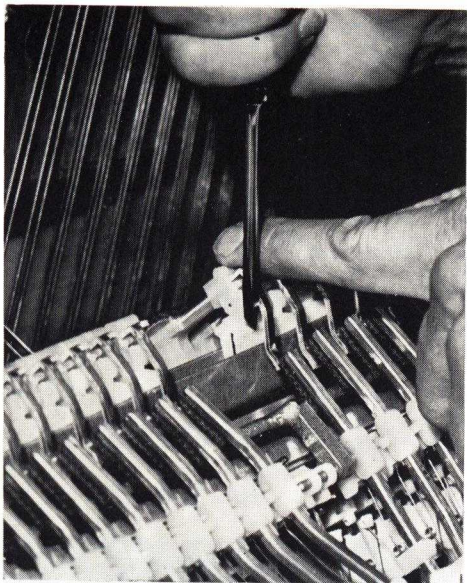
picture 15



Exchanging a lever:
Remove the bridle-tape cap from the spur, by pulling it up gently.
(15) Remove the action from its position and turn it upside down. Place a screwdriver between the protruding lip of the flange and the action beam. Twist the screwdriver and the flange will pop up.
(16)

picture 16

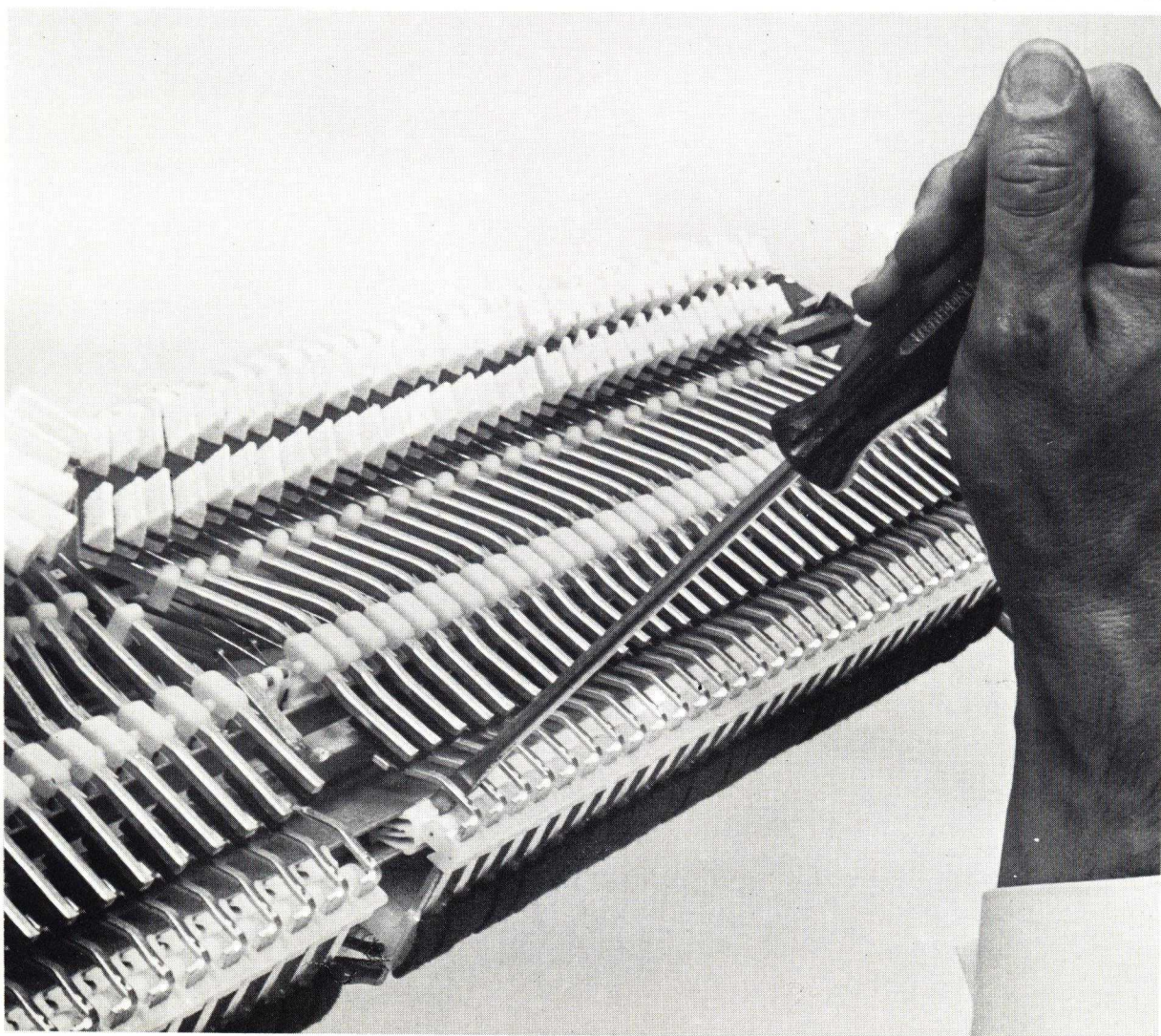


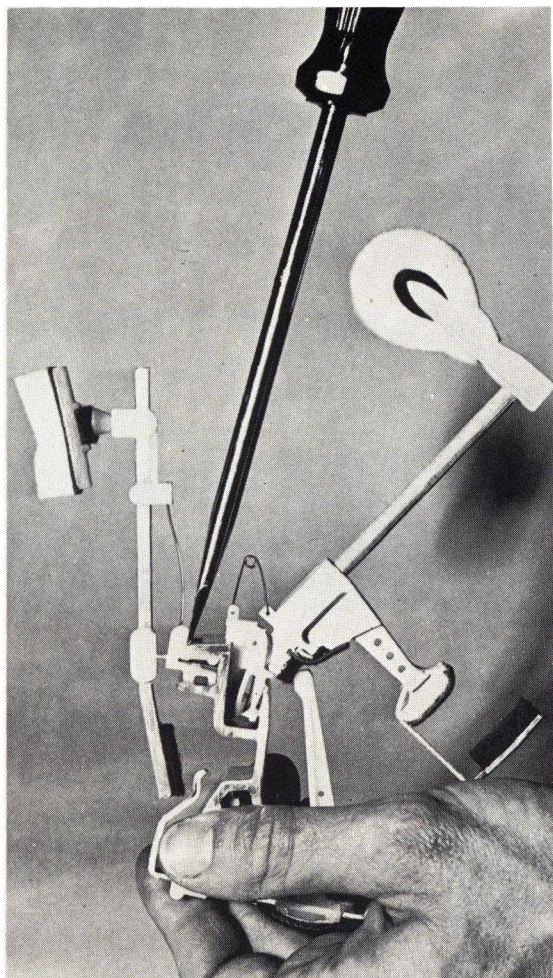


picture 17

Push the new flange into the rail and press down fully with a screwdriver on the flanges head until it snaps into position.(17) Re-connect the bridle-tape cap. Spacing can be adjusted by sliding the flange sideways in the rail with the aid of a screwdriver.(18)

picture 18



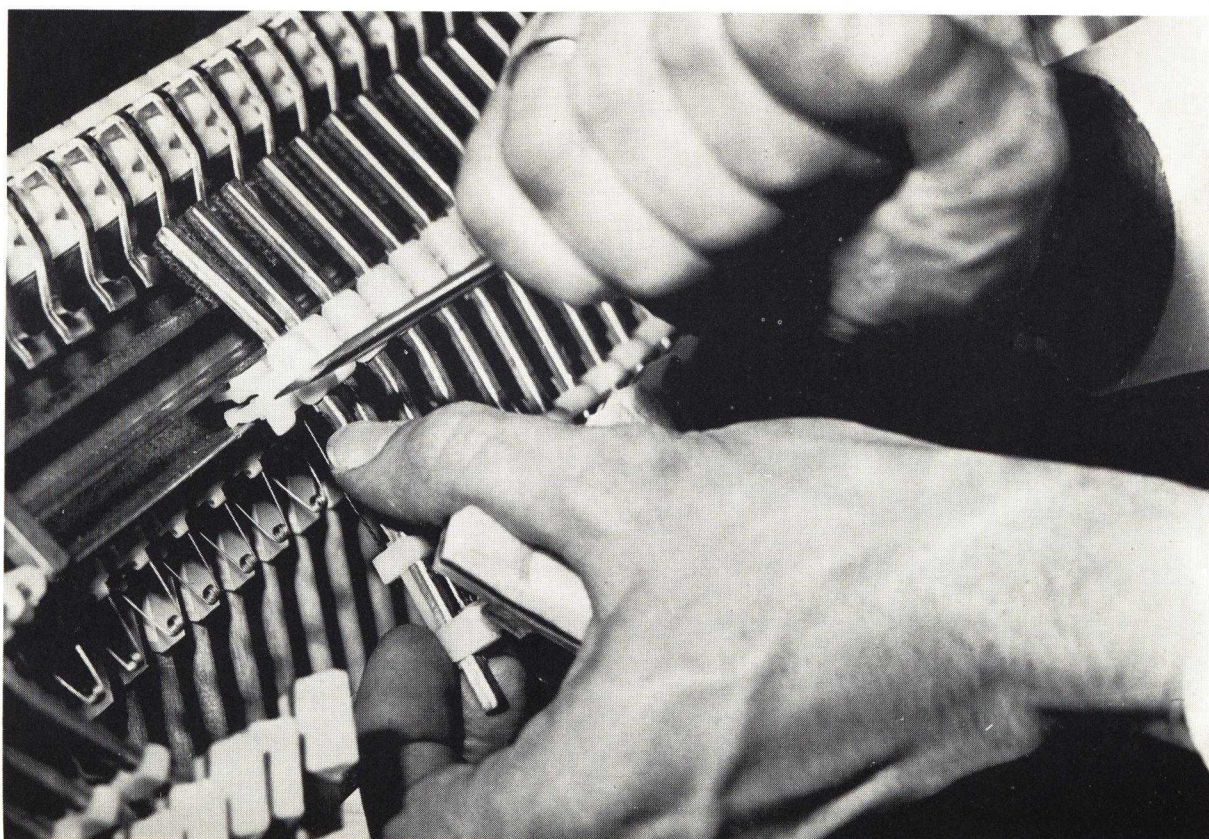


picture 19

exchanging a damper

Remove the action from its position and let it rest back in its locating brackets. Place a screwdriver between the protruding lip of the flange and the action rail (from the top) and twist the screwdriver.(19) Gently push a new flange into the rail and push it down fully with a screwdriver on the main-body of the flange.(20) Spacing can be adjusted by sliding the flange sideways in the rail.

picture 20



exchanging a key

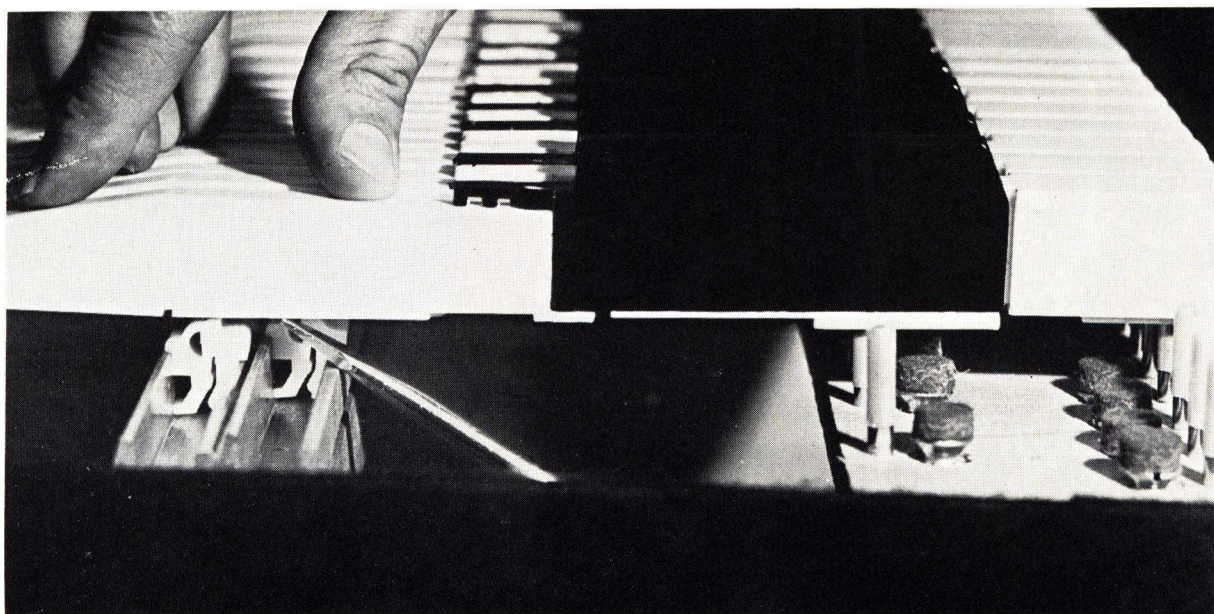


picture 21

Exchanging a key: Remove the key by setting a screwdriver between the edge of the aluminium rail and the flange and turn the screwdriver to make the flange pop up.(21) It is advisable to keep one hand on top of the key to prevent the key flying up.(22) Turn the key upside down to have more space to take the key out.



picture 22



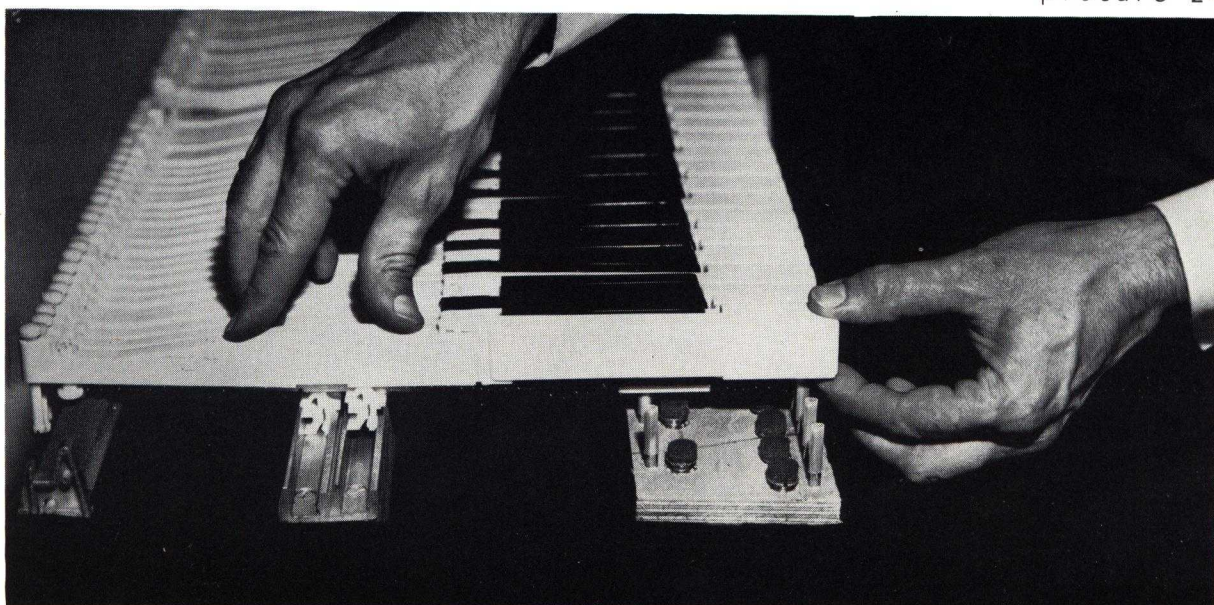
picture 23

To remove black key: Insert the screwdriver as near as possible to the flange of the key and lever the key up.

(23)

To Fit new key: Slip the flange into the slot of the balance rail and press down by hand.(24)

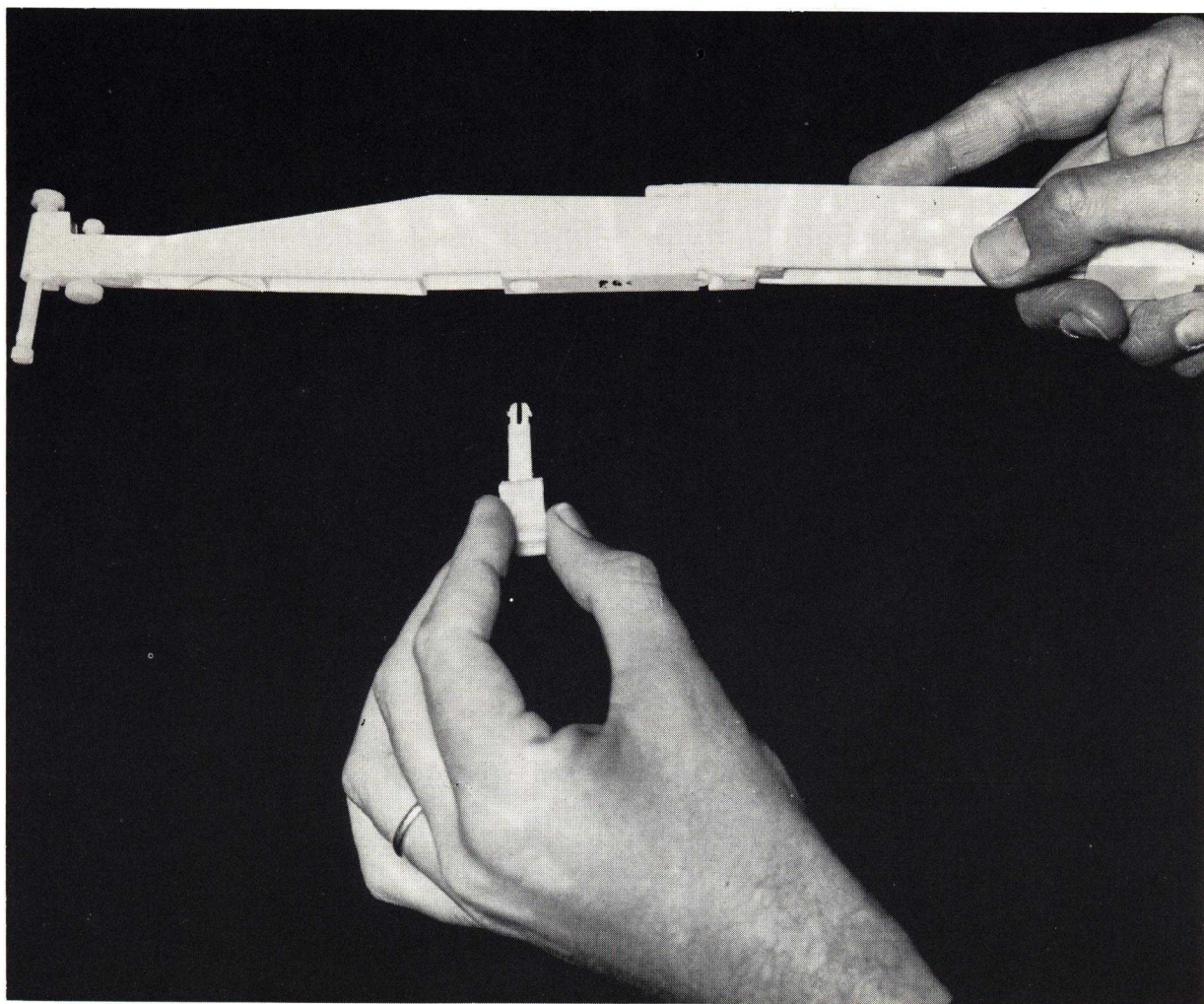
picture 24

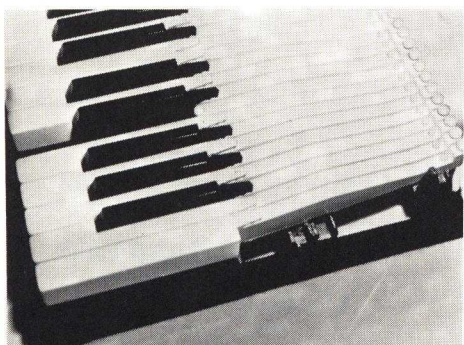


keyflange

Keyflange: Turn the keyflange through 90° and pull out. (25)
Insert a new flange by pushing in and turning through 90° (note which side of the flange is towards the front of the key).
When fitting a key, it should be watched that the keyflange is turned until it's sides are parallel to the front section of the key. Clip the key into the rail, pushing it by hand from the top, push on the middle straight above the flange. (see also 24)

picture 25

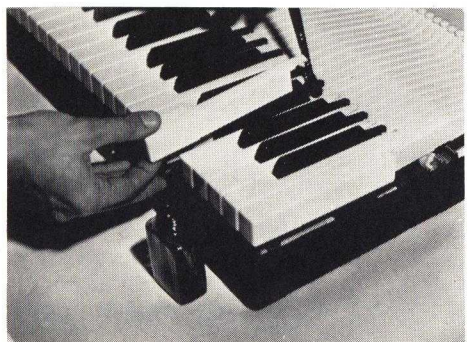




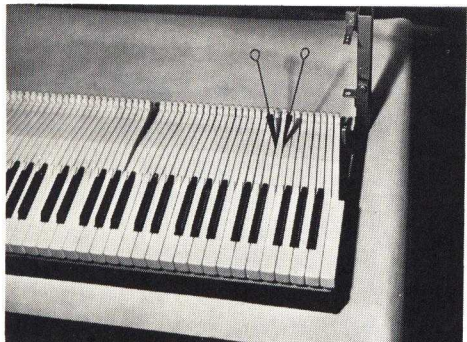
picture 26



picture 27

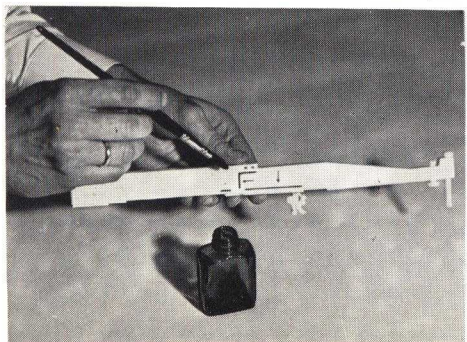


picture 28



picture 29

picture 30



making a new key from loose parts

Parts: Remove the faulty key and flange as described on pages 21 and 22. Assemble the keyflange to the rear part of the key (pict.22) and fit these into position in the balance rail.(26) Lift the back-key off the balance plate. Apply some solvent on to the balance plate (27) and fit the back-key on again. Apply some solvent into the front of the back-key where it will join into the front-key. (28) Fix the front-key into the back-key and wedge the whole key into position with rubber tuning wedges or felt wedges.(29) To adjust the lengthsetting of the key, slide the key forward or backward over the balance-plate. This should be done as quickly as possible before the solvent has evaporated. Allow the key approximately 5 minutes to set. Then the key can be regulated. Level first as per instructions on page 9, then adjust capstan screw and finally depth of touch. Remove the key carefully, and apply more solvent on the joints.(30) Leave for at least three hours before playing.

Keys can be cleaned with water containing a few drops of detergent.

To remove scratches or solvent marks from the keys, use normal polishing paste on a cloth, if the marks are deep, sand the key with very fine sand paper (400 grit) and polish with paste.

Important: When ordering a new key for Lindner piano, please specify the serial number of the piano and the number of the key, counting the first bass key as number 1.

Exchanging bat pin sleeve:

Remove Key.

Remove faulty sleeve.

Slowly, slide on a new sleeve until the top of the sleeve is level with the top of the batpin.

Insert Key.

Exchanging a Wrest Pin:

1. Turn the pin anti-clockwise to facilitate removal of the string.
2. Turn the pin clockwise (left hand thread) to make it come out.
3. Drive in a new pin until the string-hole is approximately $\frac{1}{4}$ " away from the frame.
4. Insert string and turn pin clockwise while insuring that each new coil sits closer to the wrestpin than the preceeding one.
5. Drive the pin down further until the string touches the wrest plank.

In case a wrestpin is broken follow these instructions:

1. Remove back panel from the rear of the piano.
2. Drive a punch from the **back** right through the wrest plank until the pin comes out at the front, follow instructions as from 3 above.

casework (cabinet)

The Lindner casework is finished with finest quality satin cellulose lacquers, or in the case of High Gloss with polyester lacquer.

Satin finish cases can be repaired as follows:

Surface scratches:

Where the lacquer only is affected, it can be treated with a little cellulose thinners, which can be rubbed down with finest steelwool after drying.

Deep scratches or dents:

Where the colour is affected should patch first be coloured in with powder colour or coloured filler. Then build up with thin coats of cellulose lacquer (can be applied by brush), sanding in between each coat, and finally steelwoolling.

High Gloss:

Repairs need special treatment for which instructions and a repair kit are available on request.

IMPORTANT:

It is recommended to all dealers that a stock of spare parts be kept to facilitate fast repairs if needed. Lindner can supply a set of parts or repair kit, containing a number of parts of each type at a nominal charge.

When ordering any type of replacement part for a Lindner piano, the piano number should be mentioned on the order. This is to make sure that the correct parts are despatched. When ordering a key the number of the key should be mentioned, counting the first bass note as number 1.

Should any problems arise, the makers will only be too pleased to furnish information and assistance. It is quite understandable that an entirely new piano of this type will give rise to queries and the makers attach great value to giving the fullest information possible.

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