C. BECHSTEIN

Grand Piano Regulation



SCHUTZMARKE
C.BECHSTEIN

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I First Evaluation

Regular usage of the instrument as well as climatic ambience have an influence on the keyboard and action assembly of an instrument and thus on the instrument's touch. Critical changes can even impair the keyboard and action assembly's function.

It is thus necessary to check and eventually adjust the regulation on a regular basis. In order to do so, the technician must understand how the respective parts interact and how their adjustment influences the touch. In order to do so, it is also mandatory to know the manufacturer's specifications.

Take the time to analyze the cause of any change in regulation. It is essential to address the cause of these changes rather than only the symptoms.

Climatic conditions do not only have an effect on tuning stability but also on touch. Changing one aspect of the regulation usually has an effect on other aspects that then also need to be taken care of. Changing the regulation can also impair the stability of the keyboard and action assembly. Felt and paper washers compress with time and usage. Touching them eventually impairs this stable structure. Analyze the entire keyboard and action assembly as to regulation and touch first, then decide what needs to be adjusted, i.e. changed.

II Cleaning the Instrument

Remove the fall board, the key slip and the key blocks. Be careful in removing the cabinet parts in order not to damage any parts or the finish. Depending on the design and production year, you may have to remove the key blocks first and then the key rail, the newest generation of key rails can be disassembled before you take out the key blocks.



Prepare a perfectly straight table big enough for the entire keyboard. Now you can pull out the keyboard and the action assembly and place it on the table.

Attention! Make sure not to press any key while extracting the keyboard. All hammers have to be in rest position. If not, the hammers can be blocked at the pin block and consequently the hammer shanks can break.

Remove all dust or dirt inside of the instrument. You can gently vacuum-clean the instrument and the action. Be careful not to bend or damage any action parts, dampers, etc. while cleaning. A soft brush can help you to carefully eliminate dust there. Clean the key tops with a damp cloth using water mixed with methylated or ethyl alcohol. Clean the front- and balance-pins with a cloth moistened with methylated alcohol and treat the front pins with lubricant such as ProLube.

Leather bushings should only be treated with dry lubricants such as Teflon powder. In order to clean the entire keyboard you might have to remove the key stop rail and the action. Pay attention to the position of the screws. When you re-assemble the action, each screw should be used in the same place it was in before. When re-inserting the screws, turn the screws anti-clockwise first, until the screw finds the thread again, only then tighten the screws clockwise. Then you can slide the keyboard and action assembly back in its place in the instrument. When doing so, mind not to press any key and see that all hammers are in rest position.

III Check and Tighten Screws

Screws come loose due to climatic changes. Tightening the screws is mandatory to achieve a stable regulation and helps avoiding noise. Please check the screws of the action (action brackets to keyboard, flange screws, action rail and hammer rail screws), screws at the cabinet and at the iron frame. Be careful not to over-tighten the screws. Flange screws should be tightened moderately. Do not damage the flanges.

1 Plate Screws

All accessible plate screws should be fastened. Especially mind the peripheral hexagonal plate screws. Special tools are available.

2 Action Screws

Screws fixing the action brackets to the keyboard, hammer and whippen rail screws and flange screws should be fastened.

If hammers need to be spaced to the strings, this should be done before fastening the hammer flange screws. Please note that hammers can only be spaced when they show no string grooves.

IV Key Frame

1 Bedding the key frame

Under normal conditions the bedding remains stable. However, if the instrument is or was exposed to extreme climatic changes, the wood of the key bed and key frame rails can react accordingly, resulting in the rails of the key frame not to have the required contact to the surface of the key bed. Check by tapping on the key frame with your fingers. A frame that does not rest upon the key bed will cause knocking noises. Furthermore, the energy applied on the key by the pianist will not be transferred completely in acceleration of the hammerhead. When using the left pedal, the movement of the keyboard should be absolutely silent. Eventually use lubricant, preferably a dry lubricant such as Teflon powder.

Bedding Screws

If the bedding screws do not touch the key bed, the key frame will knock while playing and energy will not be transferred from the keys to the hammer completely. Check by tapping on the screws with the hand or fingers. If you hear a knocking noise, the screw does not rest upon the key bed. In this case turn the screw clockwise in order to make it just touch the key bed.

Make sure that the screws do not lift the keyboard. This would increase the key dip and eventually even cause the back or front rail to lift. Upon slightly lifting the keyboard at the hammer rail, the key frame must start knocking.

In order to check the screw on the far left, slightly press the left pedal. If the bedding screws are way too high, upon tapping you will eventually not hear knocking noise, however the keys will move up and down upon pressure applied to the balance rail or bedding screws. If this is the case, the bedding screws have to be lowered until the keys stop rocking upon pressure. Then proceed as described above.

Please note: shortly before a concert with limited time, it may not be reasonable to adjust the glide bolts correctly and eventually then adjusting the entire key dip (time management!). Keep in mind that effects due to climatic changes may be temporarily. With changing climate the effect might again reverse itself. Only in this case, it may make more sense to adjust the key dip with the glide bolts. Generally these bolts are of course not meant for adjusting key dip. The appropriate adjustment of the screws may vary depending on the situation.





Tap with the heel of the hand or with 2 fingers at the key-frame-guide adjusting screw



Lifting the action while knocking



Turn the glide bolts

Front Rail

Tap the front rail. As soon as you hear knocking noise, this part of the rail does not touch or rest upon the key bed. You will then have to sand or plane the areas of the rail where it touches the key bed (where you do not hear knocking noises while tapping).



Tapping the key frame



Sanding the key-frame

This procedure requires skill and training and is irreversible.

2 Key Block Adjustment

If the key frame moves back and forth or the key frame knocks at its far left or right end, the play within the key block needs to be adjusted. In recent instruments this can be done easily with a screw accessible at the front of the key block. With older key blocks the brass plate needs to be lowered or replaced. Please mind not to lower the fixation excessively. The key block must not rock on the keyboard guide pin..

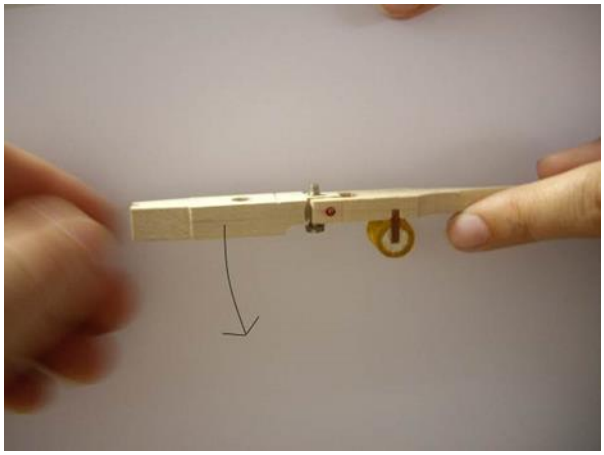
V Check the Hammer Center Pins

Check the hammer shank center pins for loose or tight pins or soft bushings. Position a finger on the hammer at the end of the hammer shank and move it carefully (without pressure) to the left and right. If the pin is loose, you will feel the pin's movement within the bushing or the flange. Please note that you must be careful not to bend the pins. This procedure requires skill and experience.

Install a new center pin when the pin is too loose. The friction of the hammer center pin is correct, when the flange moves slowly downwards when holding the hammer shank horizontally. When you insert a screw into the flange, the flange should end in a 90° angle to the shank. This equals a friction of 3 g (+/- ½ g). If the hammer flange does not move down by its own weight (too much friction), you can apply center pin lubricant. If this is not enough, you may have to re-pin the center.



Checking the hammer centre pins



Testing pin friction

VI Key Easing

Easing the keys is mandatory for consistent touch and smooth movement of the keys. For lateral movement as well as for the key bottom hole we generally advise to have as little play as possible and as much as necessary.

Too much play leads to imprecise touch, too little play may lead to heavier touch or even sticking keys. Even with climatic fluctuations the keys should never stick. Key pins should be clean and smooth..

1 Front Pin

All keys should have 0.2 mm lateral movement at the front guiding pin, in rest position and also when the key is depressed. Check each key by moving it from side by side, while stabilizing the key at the balance rail.

If the keys have too little lateral play, press the bushing of the keys with key easing pliers.

Be careful not to increase the play too much.

Check the front rail guide-pin by pressing the key moderately sideways against each side of the pin and moving the key up and down. It has to be smooth, polished and free from scratches and corrosion. Eventually the keys must be polished and treated with lubricant.



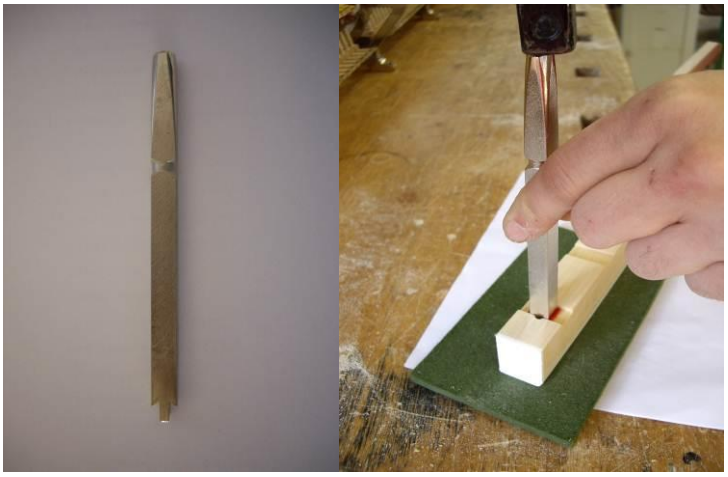
Check the lateral movement at the front pin



Check the lateral movement of depressed key



Key easing pliers



Key bushing tightener

2 Balance Pin

The keys should also have lateral play of 0.2 mm at the balance pin. Adjust if necessary as described above.



Lateral movement at the balance rail



Easing the balance button bushing

3 Key Bottom

Upon lifting the keys slightly, they should slowly fall down by their own weight. If keys do not fall, check whether the surface of the pin is smooth enough. Eventually use lubricant. If this does not help, you might have to ream the hole with an appropriate smooth and conical reamer. Do so not by taking away material, only by slightly compressing the wood.

VII Hammer Adjustment

The keyboard rail at its left side must firmly rest against the rest rail. In rest position the hammer shanks should be centered above the whippens, hammerheads should be vertical and parallel with even spacing.

The hammers should hit the strings either centered or as described below. While traveling the hammerheads should have equal distances to adjacent hammers.

Do not adjust hammers that show string grooves. The Voicing would suffer and change to a nasal sound and the hammers with the grooves shifting into the strings would cause stress on the center pins.

1 Hammer Travel



Hammer travelling



Paper shims under the hammer shank flange

The hammerheads should move vertically and parallel to adjacent hammers from rest position to strike position. Lift the hammer shanks up and down using a ruler. The space between adjacent hammers should remain the same. If a hammer travels sideways, adjust by gluing paper under one side of the flange. Check and adjust several times. Please note that it may be intended that a hammer travels to one side in order to achieve perfect rest position as well as perfect strike position.

2 Hammer Angle

All hammers should be vertical and parallel. Observe this carefully and compare the space between each hammer. In the bass the space to adjacent hammers should be the same at the upper right side and the lower left side. In the lower tenor the space to adjacent hammers should be the same at the upper left side and the lower right side. In order to achieve vertical hammers, it may be necessary to reduce the respective upper

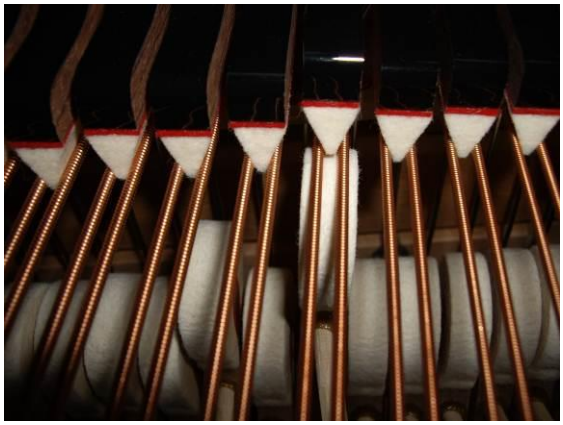


space. To change the angle of the hammer, heat the hammershank and twist the hammer in the appropriate direction.

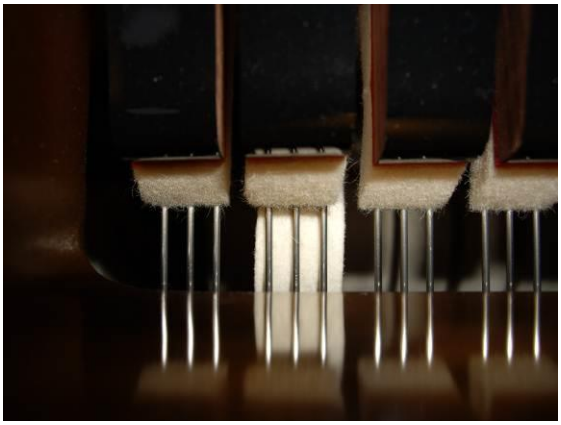
3 Spacing Hammers to Strings

Space the hammers to the unisons: centered in the bass, as of the tenor, 1 mm of the hammer should be visible on the left side of 3-string unisons. The hammers should never be spaced tending towards the left side of the unisons. Perfect spacing is a pre-requisite for a good and balanced voicing, including shift position.

Please note that hammer travel, angling and alignment described above influence one another.



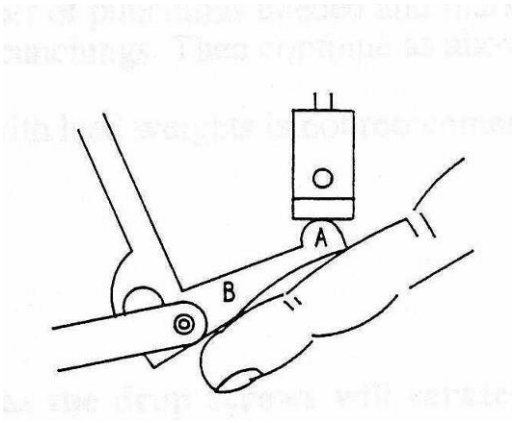
Hammers centered in the bass



Hammers 1mm left of the trichords



Spacing hammers to strings



a) Press jack into let-off button

b) Lift the Hammer

VIII Key Levelling

The white keys should be horizontal and parallel to the key bed. Check with a straight edge to see whether the white key tops are parallel to the straight edge. Adjust the angle of the key surface at the balance pin.

Level all white keys by inserting or extracting paper washers with different thickness at the balance pin. The paper washers must be cut on one side, in order to insert them under the balance pin felt when keyboard and action are joined. The thinner papers should be placed on top, thicker washers below. Check and adjust the distance between each key with the key spacing tool at the front pin.



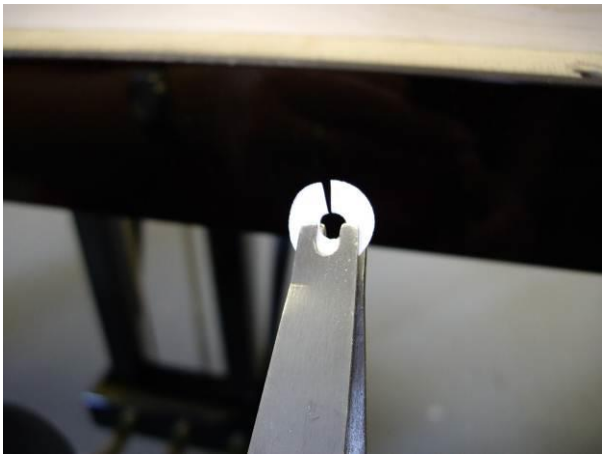
Key tilts to the left



Angling the keys



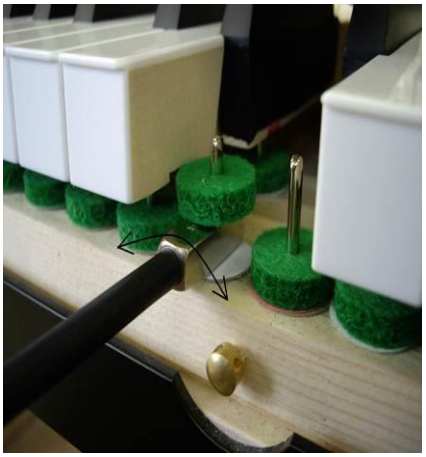
Inserting paper washers



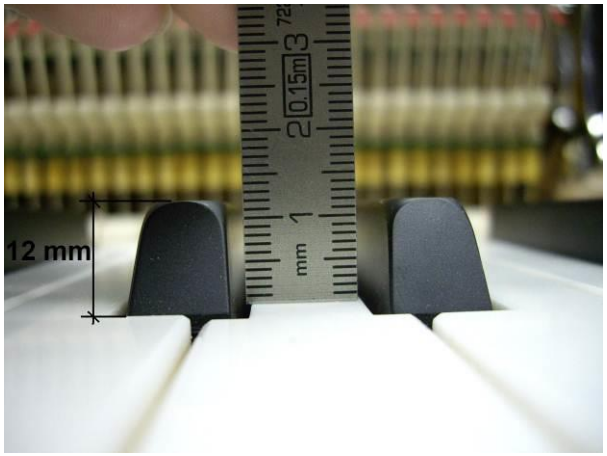
Cut paper washer







Spacing the keys



The surface of the black keys should be 12 mm above the surface of the white key tops. When the black keys are depressed they have to be 2 mm above the surface of the white keys. Before levelling the black keys, center their balance buttons between the balance buttons of the white keys. Level the black keys with the ruler.

Sharps 12 mm above white keys

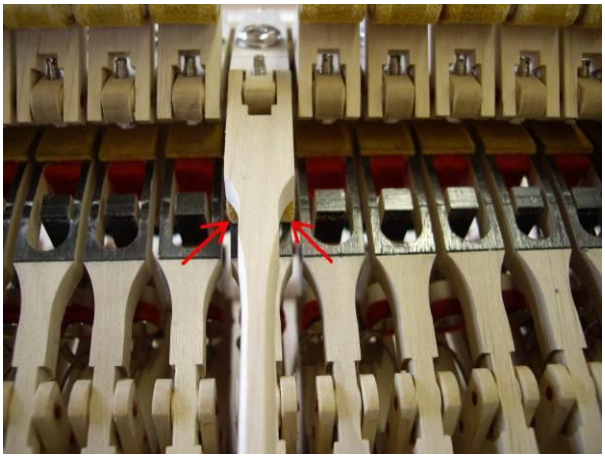
Please note that key depth, keyboard levelling and the after touch influence one another. So if you change the key height, the other functions just mentioned will also change.

IX Whippen Adjustment

When adjusting the whippens, three positions must be aligned. The knuckle should be centered to the repetition lever, the jack to the let-off button and the whippen heel to the capstan. Additionally all whippens should be vertical and spaced equally. Adjust by spacing or slightly turning the whippen flanges and/or gluing paper under the flanges.



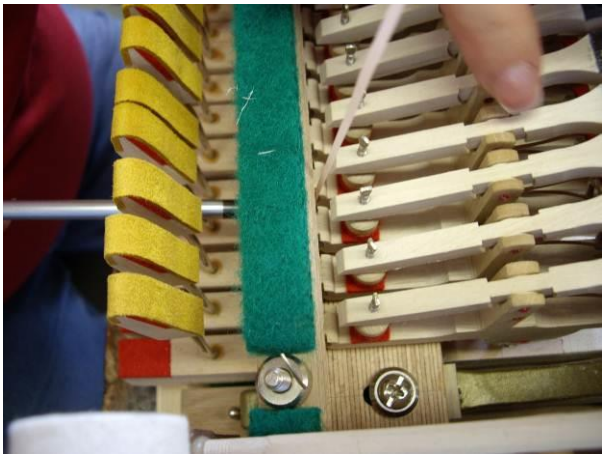
Capstans to whippen heels



Knuckles to repetition lever



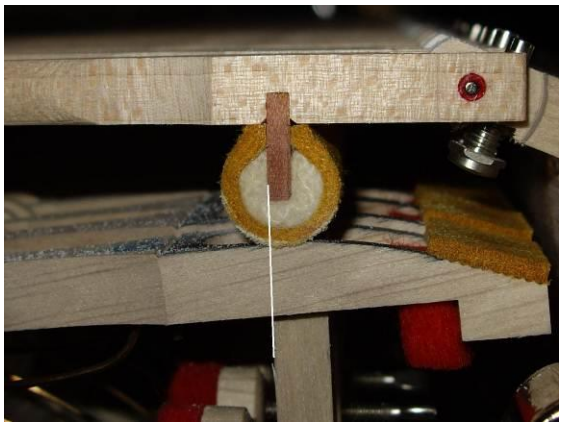
Spacing the whippen flange



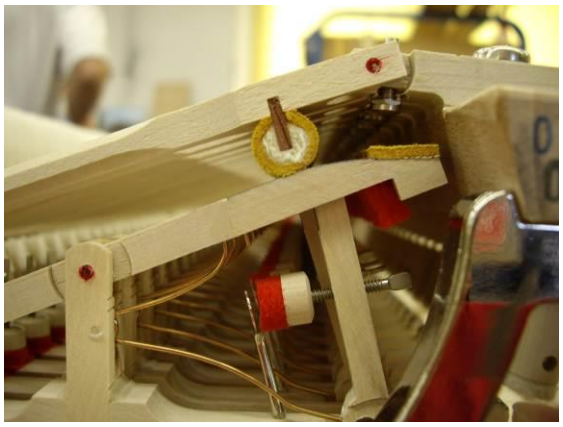
Inserting paper

X Jack Alignment

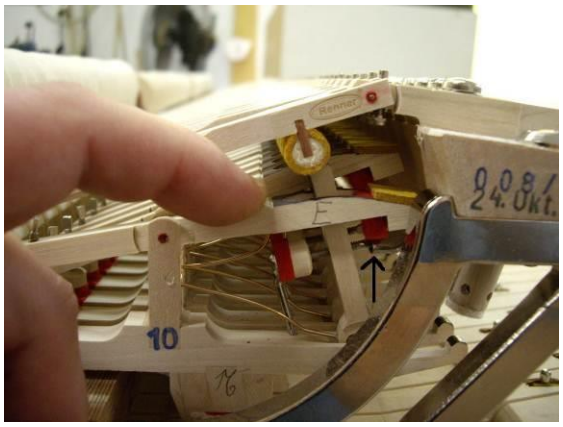
The side of the jack nearest to the hammer should line up with the edge of the knuckle core wood nearest to the hammer. Depress the repetition lever with the index finger and check the jack position. Adjust the jack position with the jack-regulating screw. If the jack is not positioned far enough under the knuckle (if it is closer to the drop screw), the jack might slide away from the knuckle, when the key is played with considerable force. This leads to less power or even malfunction. If the jack is positioned too far under the knuckle, friction increases at let-off and the repetition speed may suffer.



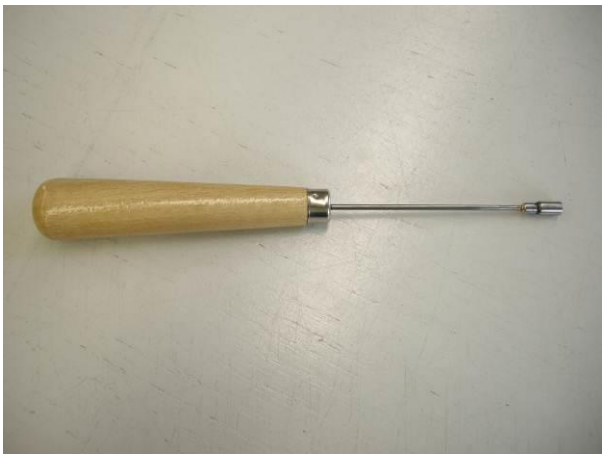
Correct position of the jack to the knuckle



Jack is too far out



Jack regulating screw

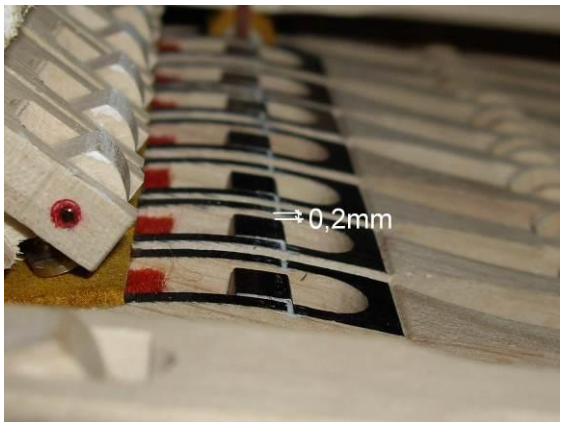


Jack regulating tool

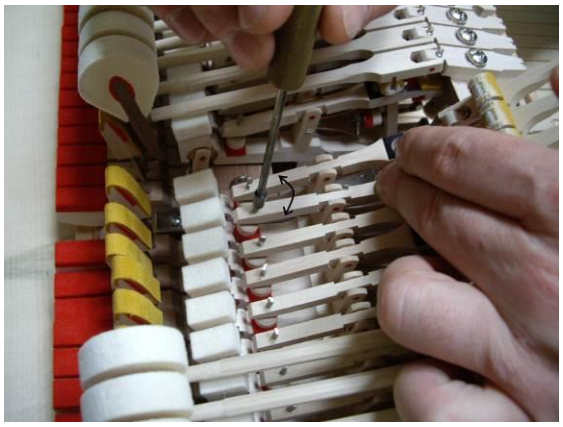
XI Repetition Lever Height

The clearance between the top of the jack and the repetition lever has to be 0.2 mm to assure perfect repetition. Adjust the clearance with the repetition lever stop screw.

If the repetition lever is too low, the jack cannot move under the knuckle, which will impair repetition speed and precision. If it is too high, the pianist loses contact to the hammer due to lost motion between the jack and the knuckle. If the repetition lever is too high, the hammer line (blow distance) can become unstable and irregular.



Jack 0,2mm under Repetition lever



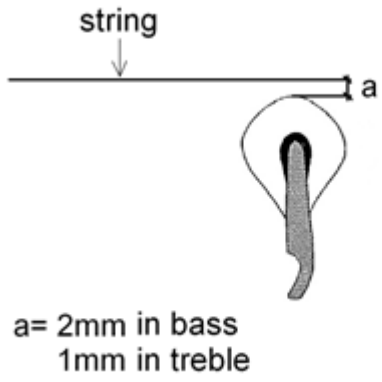
Adjusting at the regulating screw

XII Let-off

The hammer let-off distance is determined by the amplitude of string vibration. The longer and thicker the string is, the higher the amplitude, the more let-off distance.

Let-off should be 1-2 mm from the strings in the bass (½ the strings thickness) and 1-1.5 mm in the tenor and treble section. Adjust the let-off distance by turning the let-off button. By turning the button to the left (clockwise if seen from above), the let-off distance will increase.

Insufficient let-off can lead to double strike; with too much let-off distance the pianist loses contact with the hammer, thus loses control.





Adjusting let-off

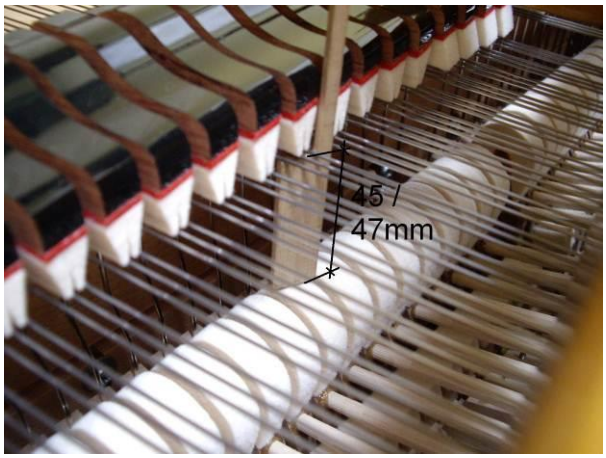
XIII Hammer Blow Distance

The blow distance is the distance from rest position of the hammers to the strings. Blow distance should be 45 mm for models L, M/P and B and 47 mm for models C and D.

Measure the distance with a ruler or a special jig inserted between the hammer and the strings. Adjust the first and last white keys of each section. Then adjust all other hammers of the section to the same level.

By increasing the strike distance, the after touch will be reduced and vice versa.

Please keep in mind: blow distance, after touch, key dip and let-off are all related..



Hammer blow



Adjusting the hammer line

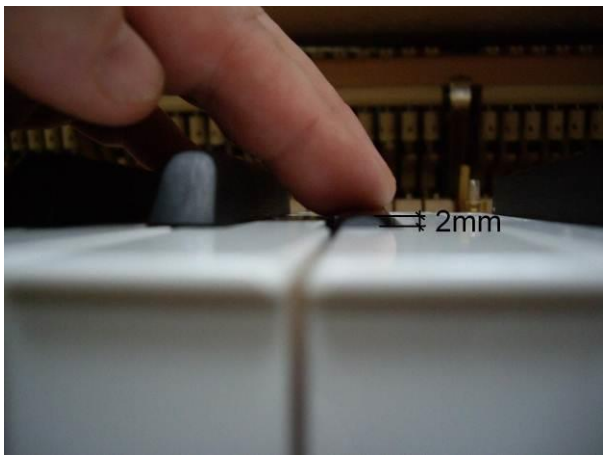
XIV Key Dip

The key dip for models L, M/P and B is 10 mm and 10.2 mm for models C and D. Check the key dip using a key dip block. Depress the block with consistent pressure on each key and compare the height of the touch block with the height of the adjacent key top. If the adjacent key is higher than the key you are adjusting, insert paper washers with the respective thickness to compensate. If the adjacent key is lower, remove paper washers. Place thinner papers on the top, just under the front felt washer, thicker papers below. Double check the after touch. In case of insufficient after touch, key dip may have to be increased. To re-check consistent key dip, depress three adjacent keys together and check whether they have the same height.

Regulate the key dip of the black keys by adjusting the after touch to the same level as the white keys. When the black key is depressed it should protrude 2 mm above the white keys.



Jig for key dip



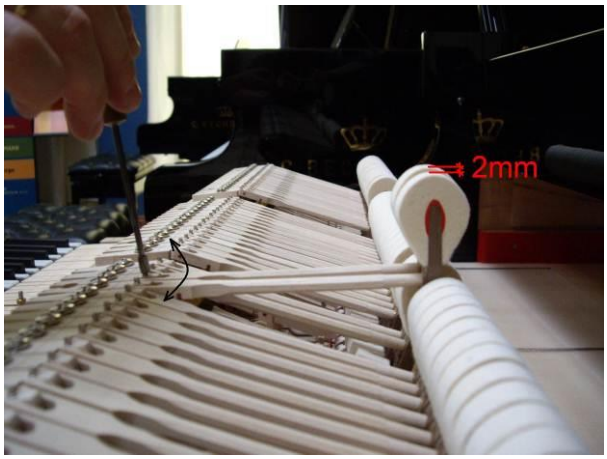
Depressed sharp 2mm above white key

XV Drop

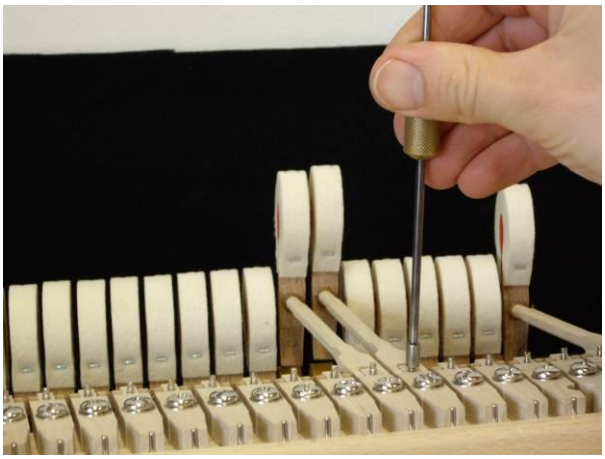
After let-off, the hammer drops 2 mm below let-off. Depress the key and let the hammer drop after let-off. Then depress the adjacent key slowly observing the timing for hammer let-off. Let-off must be 2 mm above drop position.

Adjust drop at the drop screw. Double check depressing several adjacent keys together, all hammers should be on the same level. Note that the tension of the repetition spring influences drop height. Adjust spring tension before adjusting drop.

The hammer drop prevents the repetition lever from pushing the hammer against the strings. When the hammer drops too far, the jack will take more time to re-enter under the knuckle – thus slowing repetition and changing the impression of after touch. Insufficient hammer drop may cause double strike..



2 mm drop



Adjusting drop at drop screw

XVI Hammer Check

The back checks should catch the hammers reliably and as close to the strings as possible. In order to prevent one-sided abrasion, the back checks must be aligned with the hammers and the hammer-tails and back checks must be parallel. Adjust the back checks with flat nose pliers and a ruler. The back checks must be spaced equally and they must all be parallel. Make sure that the back checks do not contact the adjacent hammer or back check.

The back check should catch the hammer 15 mm below the strings and within the upper third of the back check. That is 13-14 mm below let-off and 11-12 mm below drop. Tap on the hammerhead with a finger to make sure that the hammer is caught firmly. If the hammer does not stay in the checked position when you gently tap the hammerhead, adjust the angle of the back check. Note that the back check must not touch the hammer in fortissimo.

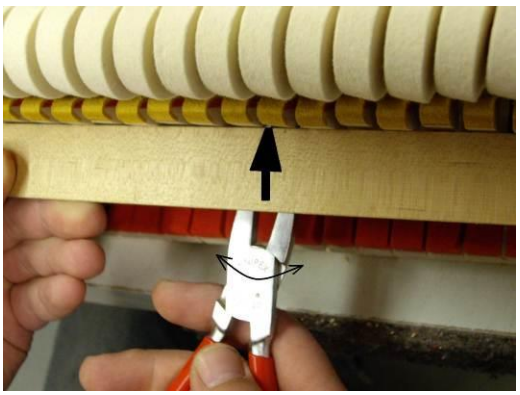
When you depress a group of keys, the back checks should catch the hammers at the same height.



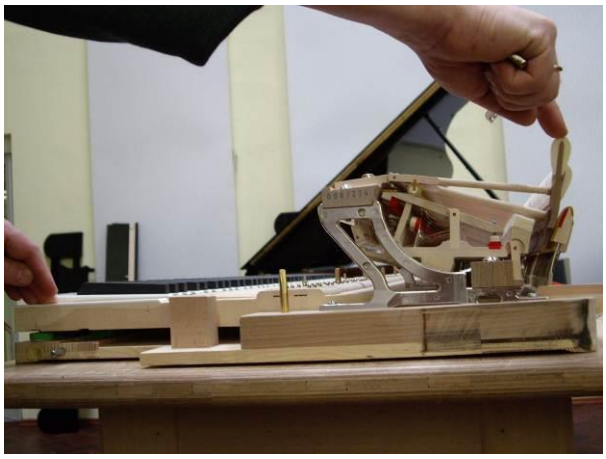
- Back checks parallel to hammers
- Back checks parallel to one another with equal spacing
- Hammers check at the same height



Adjusting the back checks parallel to the



straight edge by turning



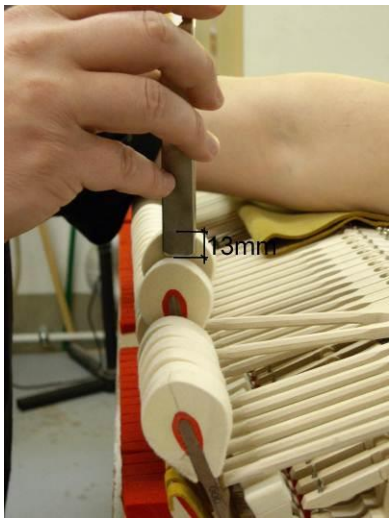
Checking back check clearance to hammer



Bending the back check wires



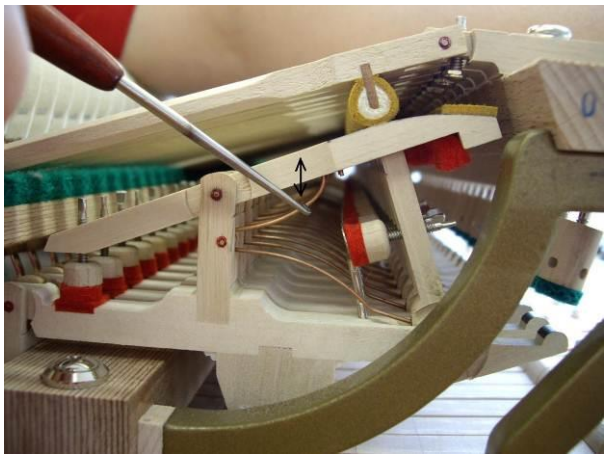
Checking in upper 1/3



Checking 13 mm under let-off

XVII Repetition Spring Adjustment

The repetition spring lifts the hammer from the check position to drop position and moves the jack back under the roller, allowing quick repetition even in the lower part of the key dip. Strike a key, allowing the hammer to check. Gently release the pressure on the key until the back check releases the hammer. The hammer should quickly rise all the way to the drop position, not too slowly. The hammer should not jump however and should hardly be felt in the key. Adjust the spring at the upper part of the spring. Be careful not to bend the spring. Do not adjust the lower part of the spring.



Adjusting the repetition spring

Please note that spring tension influences strike distance, repetition lever height and hammer drop. Higher tension may increase repetition speed, however may lead to double strike or uncomfortable touch. Check the hammer line, let-off and drop after altering the spring tension. Check friction before increasing the spring tension. Increased friction at the roller, the spring itself and at the center pins of the hammer shank and the repetition lever reduces hammer lift speed.

XVIII Damper Adjustment

Specifications for damper regulation:

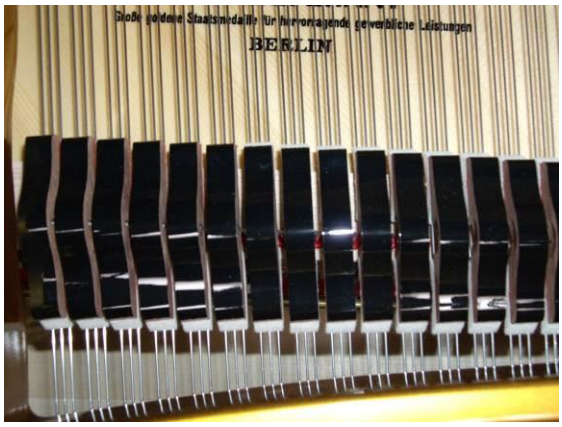
- all dampers must lift simultaneously when using the right pedal.
- dampers must travel up and down absolutely vertically without swiveling.
- all dampers should lift at half blow of the hammer.
- the right pedal should lift the dampers to the same height as the keys.
- all strings must be muted precisely and noiseless when the dampers sit on the strings.
- all dampers must be aligned perfectly to the strings and spaced equally.
- proper function of the sostenuto pedal.

Extract the keyboard and action assembly from the instrument. Before adjusting the dampers to the strings, check the vertical distance and horizontal clearance between the sostenuto rod and sostenuto tabs. Horizontal clearance should be 1-2 mm. The vertical position of sostenuto tabs should be 1 mm under the sostenuto rod. Check the damper wires for any signs of corrosion or rough surface. If required, clean and polish the damper wires. For precise damper movement, the damper wires should gently lean to one side of the guide rail bushing.

All damper wires must move freely within the damper guide rail bushing. Make sure that there is as little friction as possible between the damper wire and the bushing cloth of the damper rail. You will feel this in your finger while lifting the damper. If the friction is too high, either the wire leans too much against the felt, or the damper rail bushing is too narrow. You can widen it by using a special heated tool or by gently reaming the felt. Eventually you can additionally use lubricant.

All dampers must be parallel to the strings and centered to the string groups (unisons) and spaced evenly.

Check damper function with staccato blow and also with slow release of the pedal.

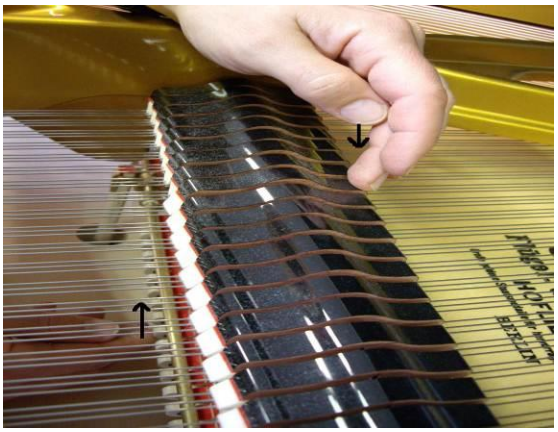


Dampers spaced to strings

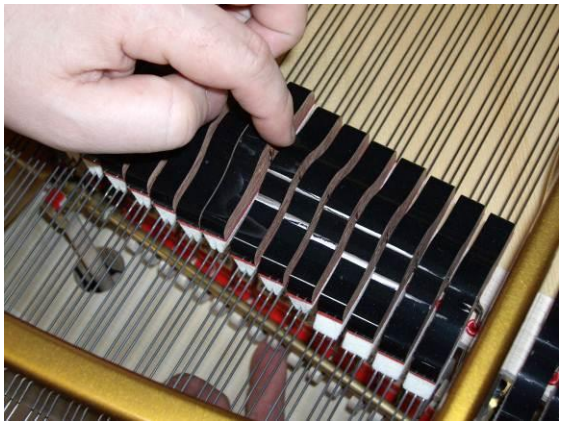


Spacing the dampers





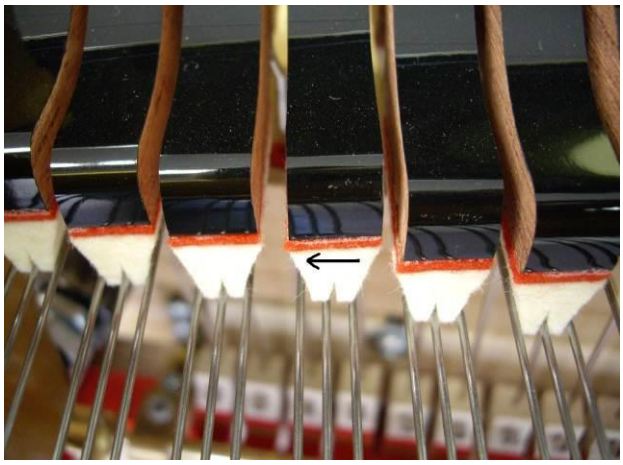
Damper lift



Testing play within guide rail bushing



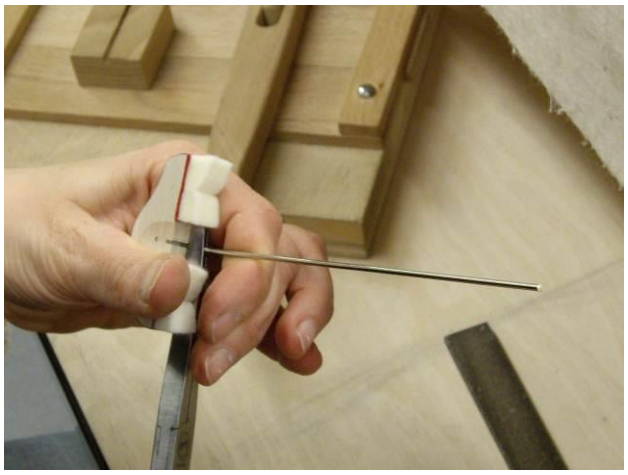
Bending the damper wires



Damper shifts to the left



Adjustment at the damper wires



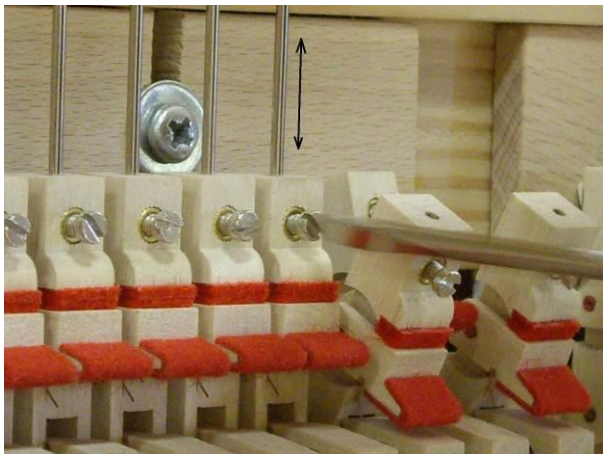
Bending the wires

XIX Damper Lift and Damper Touch

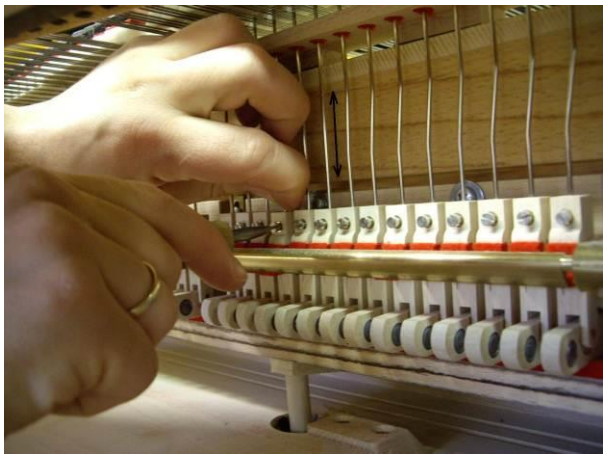
All dampers have to lift simultaneously upon pressing the right pedal. Depending on the brand and manufacturing year we differentiate between damper levers with or without damper spoon and with or without regulating capstan. In damper actions without damper spoon you need to adjust the damper lift with the pedal and the damper lift with the key at the same time. Always mind that the sostenuto tabs have to remain aligned at the same height.



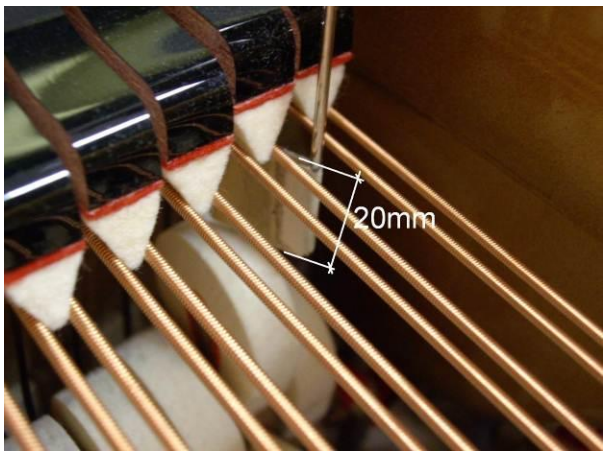
Adjusting damper touch at damper spoons



Opening the screws



Adjusting damper lift



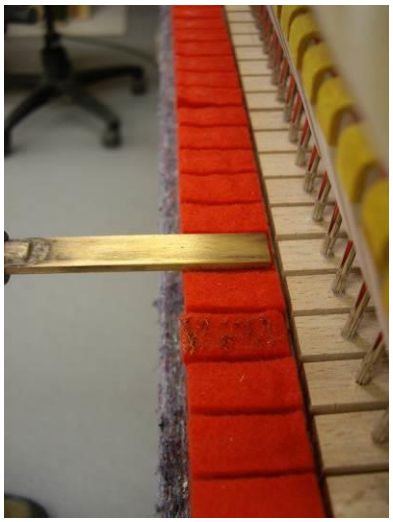
Damper touch 22mm from strings



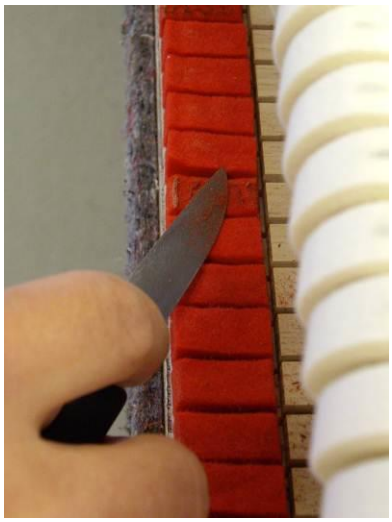
Paper shims under damper touch felt

All dampers should start to lift, when the hammer has travelled about half the blow distance (half blow). If this is not the case, you have to unscrew the damper block screw and adjust the damper lift. Either slightly press on the damper downwards, thus pushing the wire down into the block or slightly extract the damper wire from the damper block. Then gently tighten the screw. Adjusting the damper lift with the pedal changes damper touch (at the key) and sostenuto tab height.

Fine adjustment of hammer touch at half blow may require inserting paper under the damper touch felt on the key or ironing this felt. Be careful with ironing since the felt may harden, whereas it has to remain soft. In damper actions with spoon, damper touch can be adjusted by bending the spoons up or down



Burnishing damper touch felt



and cleaning afterwards

XX Sostenuto

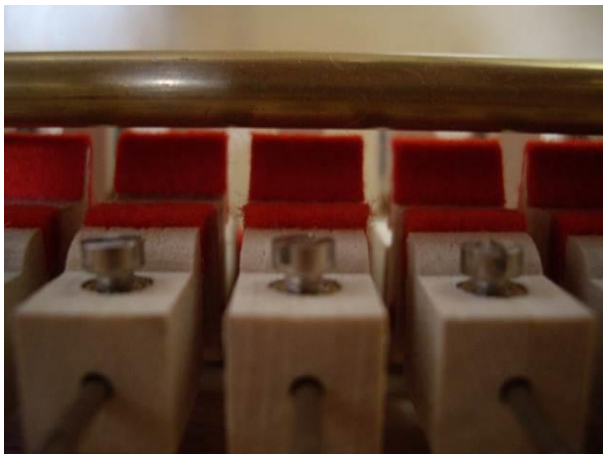
A good regulation of the dampers is a pre-requisite for sostenuto adjustment. The damper levers must not rest upon the tray, the tray should have 1.5 mm lost motion.



Sostenuto tabs aligned to sostenuto rod

Press the right pedal to lift all dampers and then press the sostenuto pedal. The sostenuto pedal should not raise the dampers. Release the right pedal while holding the sostenuto pedal depressed. All dampers should remain lifted. Even upon slightly tapping on the top of the damper levers, the dampers should not fall down. If dampers are not held with either procedure, you will have to reduce the distance between tab and rod.

Upon releasing the sostenuto pedal, all dampers should fall simultaneously.



Tab clearance to sostenuto rod

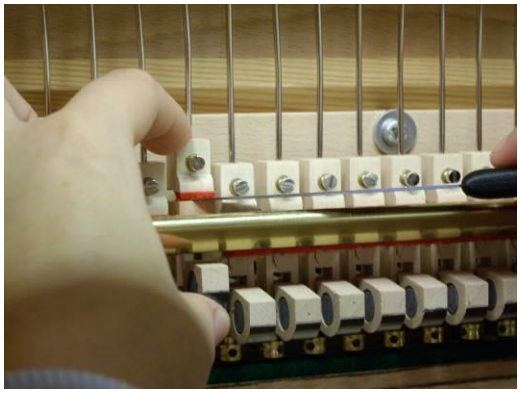


Aligning the sostenuto tabs

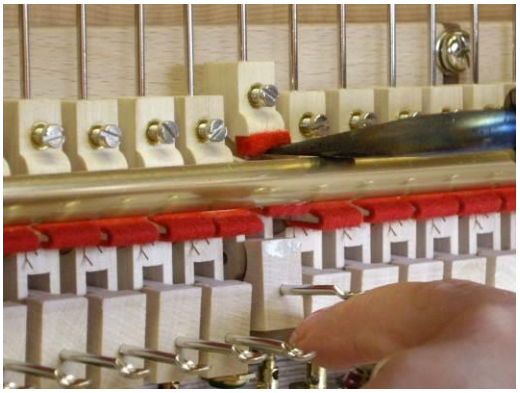
Depress the right pedal and then hold the dampers with the sostenuto pedal. Depress the right pedal again several times; the movement of the tabs should be minimal.

Re-check by releasing all pedals and then pressing the sostenuto pedal several times. No tab should be touched by the rod. If a tab is touched by the rod, the vertical or horizontal distance between tab and rod is too small.

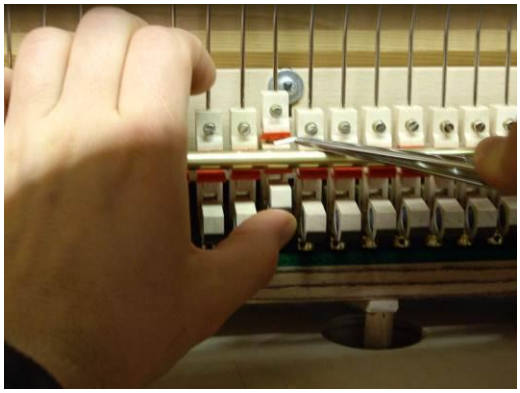
Press the sostenuto pedal all the way. Push the damper levers up one by one with your finger (thus imitating the key). No tabs should be held by the sostenuto rod; the damper should fall back down.



Cutting the felt



Burnishing the felt



Gluing paper on tabs

XXI Pedal Adjustment

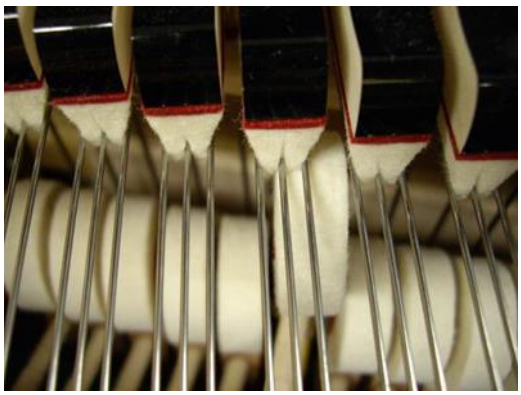
Damper pedal: (right pedal)
The pedal needs 1.5 mm lost motion between damper tray and damper lever. Adjust this by turning the pedal adjusting nut on top of the brass pedal rods up (less lost motion) or down (more lost motion).

When depressing the pedal, the damper tray should lift the dampers exactly to the same height as the key. The stop position can be adjusted on the damper lever under the key bed with a capstan adjusting screw accessible from underneath the lever

Shift pedal: (left pedal)
The left side of the keyboard should firmly rest against the felt; the pedal should not have any lost motion. Adjust at the pedal rod nuts. The shift pedal should move the hammers until the hammer hits only two strings of a trichord. The strings should now be centered between the string marks.
Press the shift pedal and press each hammer to the strings. Pluck the left strings of all trichords. The left strings of the trichords should just be free to sound. Limit the shift movement of the key frame by adjusting the screw in the key block on the right-hand-side.

Sostenuto pedal:
Press the right pedal. When pressing the sostenuto pedal the damper should rise as little as possible from the position they had with the right pedal.

(middle pedal)
Release the right pedal. All dampers should remain lifted. Now release the middle pedal slowly. All dampers should fall down simultaneously. Press the sostenuto pedal several times. The rod should not touch the tabs.



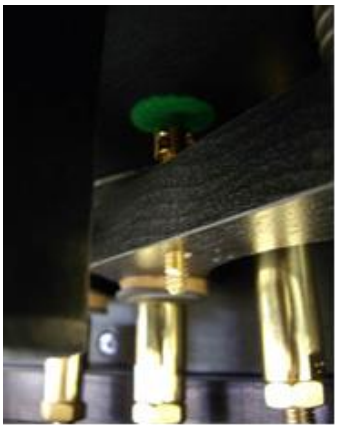
Shift position



Keyframe rests on felt



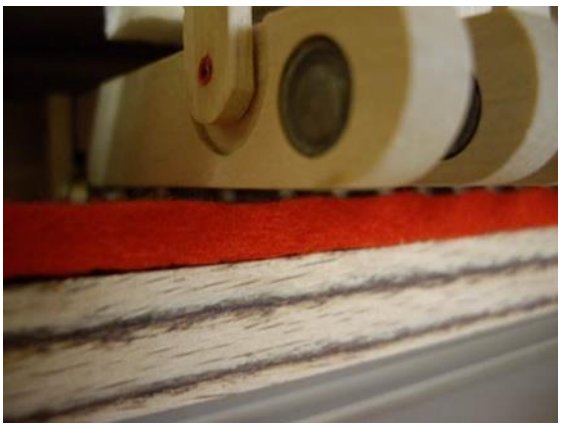
Shift stop screw



sostenuto stop screw



Pedal rod nuts



2mm lost motion of damper lift tray

XXII Touch Weight

We differentiate between down weight and up weight. Down weight is the weight with which the key starts to move down and the up weight is the maximum weight that the key is able to lift when rising from key dip to rest position.





Before measuring touch weight, you must lift all the dampers in order to eliminate their weight and friction.

The down weight decreases from bass to treble starting from 52 g in the bass to 47 g in the treble. The up weight increases from bass to treble starting from e.g. 25 g (27 g for model C and D) to 30 g in the treble.

The difference between down weight and up weight is defined by the friction in the action. Increased friction within the keyboard and action assembly leads to increased down weight and decreasing up weight. Alterations of leverage and weight of action parts and hammerheads also have an effect on touch weight.

Both down weight and up weight are balanced in the factory by inserting leads into the keys and by adjusting the friction. Friction and consequently touch weight can increase or decrease depending on the ambient climate and the usage of the instrument. In case of increased down weight, first check friction. Start with the hammer shank roller, the hammer flange center pin, the capstan and the whippen center pin. Also check friction between key pins and key

bushings and at the key bottom hole. Use C. Bechstein recommended lubricants when encountering increased friction.

Inquire about recommended C. Bechstein lubricants and handling at service@bechstein.de.

Friction at the roller can be treated with Teflon powder. Capstans should be smooth and clean.

Please bear in mind that a certain amount of friction is needed for the pianist to control the action.

Customers frequently request changing the touchweight of their pianos to a lighter or heavier touch. Usually requests of this nature can be satisfied by altering regulation standards and/or friction. It is seldom necessary to add extra lead weights to the keys.

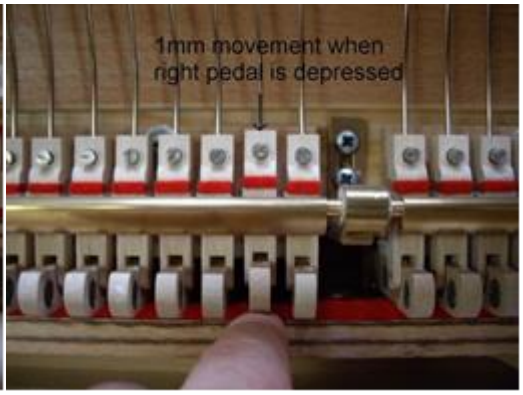
XXIII Damper Stop Rail, Hammer Rest Rail, Key Stop Rail

1 Damper stop rail:

The damper head of the black keys should have 1 mm play, when the key is fully depressed. To adjust the damper stop rail loosen the screws, adjust the rail and tighten the screws again..



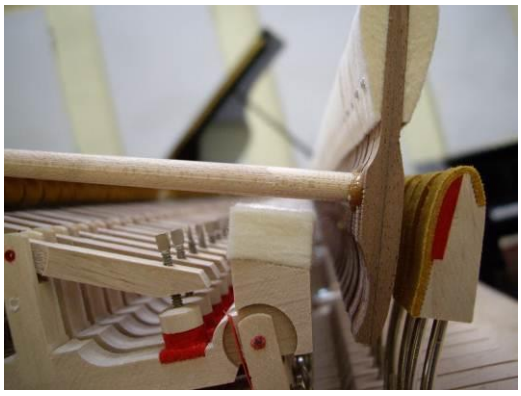
1 mm clearance to stop rail



Adjusting the stop rail

2 Hammer rest rail:

There should be a clearance of 3 mm between the hammer rest felt and the lower part of the hammer shank in rest position of the hammers.



3mm clearance to rest felt



2mm clearance to key stop rail

3 Key stop rail:

The key stop rail prevents the keys from shifting during transport. It should not touch nor depress the keys. There should be a clearance of 2 mm between the key stop rail and the black keys.

XXIV Regulation Specifications

key easing:	All keys should have 0.2mm lateral movement at the front and balance pin
hammer alignment:	The hammer should hit the strings centred in the bass section, trichords in a way that only 1mm of the hammer can be seen to the left of the string.
Repetition Lever	The clearance between the top of the jack and the repetition lever is 0.2mm.
Jack	The side of the jack nearest to the hammer should line up with the edge of the knuckle core wood nearest to the hammer
Key Levelling	The surface of the black keys should be 12mm above the surface of the white key tops.
hammer let-off	1-2 mm from the strings in the bass (1/2 the strings thickness) and 1mm in the middle and treble section
Blow Distance	45mm for models L, MP and B and 47mm for models C and D.
Key Dip	10 mm for models L, M/P and and 10.2mm for models C and D. When depressed black keys have to be 2mm above the surface of white keys.
Drop	2mm below let-off
Check	13mm below the let-off, within the upper third of the back check
Damper	The damper wires should gently lean on one side of the guide rail bushing.
Damper Touch	the dampers lift, when the hammer is about 20mm below the string.
Sostenuto	The vertical position of sostenuto tabs should be 1mm under the sostenuto rod. Clearance between the sostenuto rod and sostenuto tabs should be 1-2 mm
Damper pedal	Press random white keys. When depressing the pedal, the damper tray should lift the dampers exactly to the same height as the key. 1.5mm lost motion between the damper lifting tray and the damper levers.
Shift pedal	The hammers should strike two strings of a tri-chord only
Touch weight	The up-weight increases from bass to treble starting from 25g (27g for mod C and D) to 30 g in the treble. The down-weight decreases from 52g in the bass to 47 g in the treble.
Damper stop rail	The damper head of the black keys should have 1mm clearnce, when the black key is fully depressed
Hammer rest rail	There should be a distance of 3mm between the hammer-rest-felt and the lower part of the hammer shank in rest position of the hammers.
Key-stop rail	2mm clearance between the key-stop-rail and the black keys.