World-Wide
Technical Reference Guide

Grand Regulation

STEINWAY & SONS

Boston PIANO
DESIGNED BY STEINWAY & SONS®

Essex PIANO
DESIGNED BY STEINWAY & SONS

the Family of Steinway Designed Pianos

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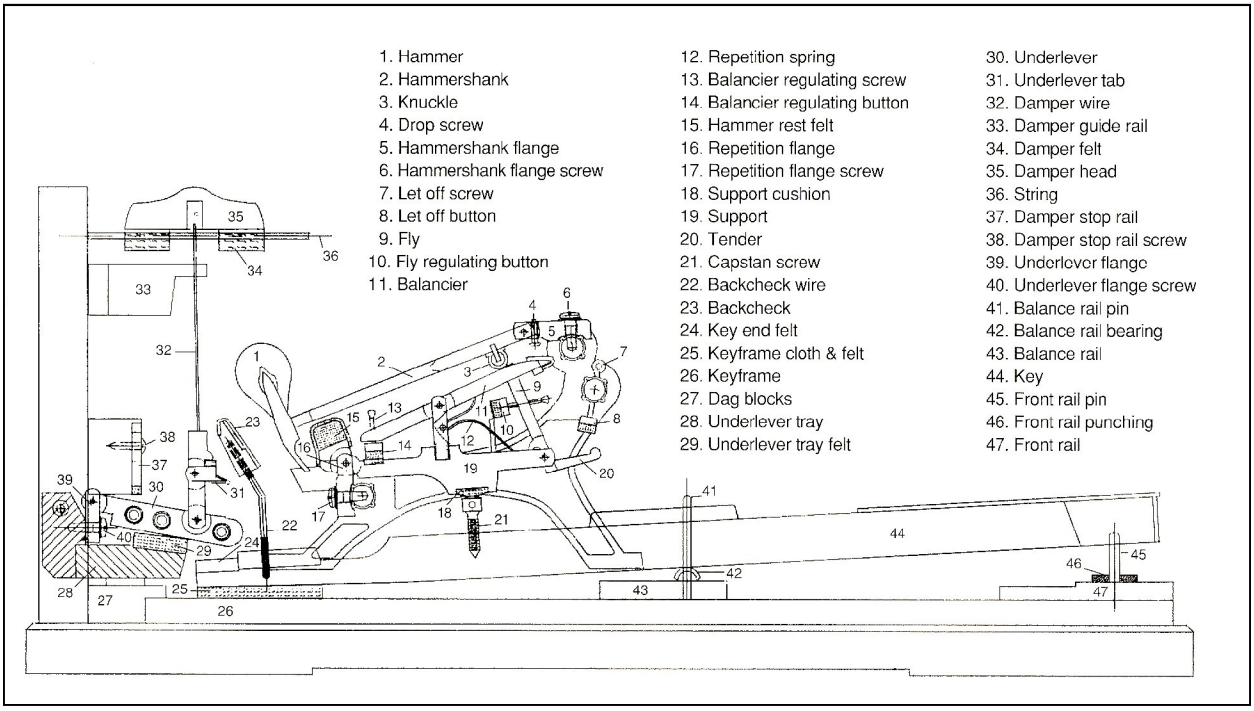
GRAND ACTION REGULATION—ACTION DIAGRAM

The following pages outline suggested steps in regulating the grand piano. It should be noted that the specifications given are important; however, they may vary within reason to accommodate individual needs of the piano player. It is important for the technician to understand the interrelationship between regulation procedures and how they affect the instrument's performance, and to use this understanding in determining individual needs of the instrument and the performer. **Since individual regulation steps affect others, repeating operations will be necessary in achieving stability.**

Prior to regulation, the steps outlined in "Grand Preparation" should be performed or checked for compliance.

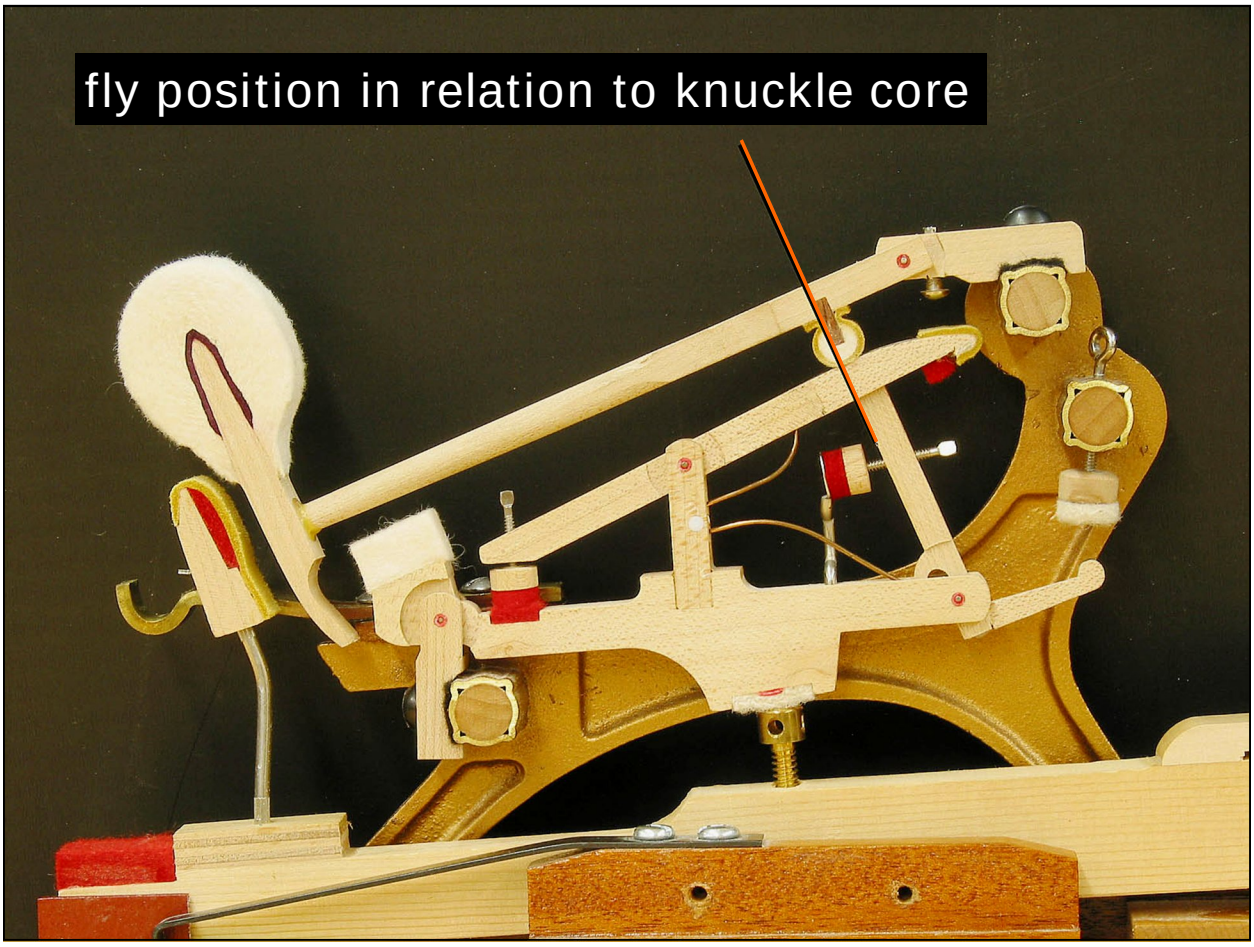
Diagram of Grand Action and Key (without Sostenuto)



REGULATE FLY POSITION

Background: The fly position is critical in obtaining a controllable stroke of the hammer. If the fly position is too far forward, it will escape too early and the hammer will have little control, little power, and possibly a misfire. If the fly position is too deep under the knuckle, the result will be excess friction and poor repetition.

HOW: Regulate the position of the fly so that the far side of the fly aligns with the far side of the knuckle insert.



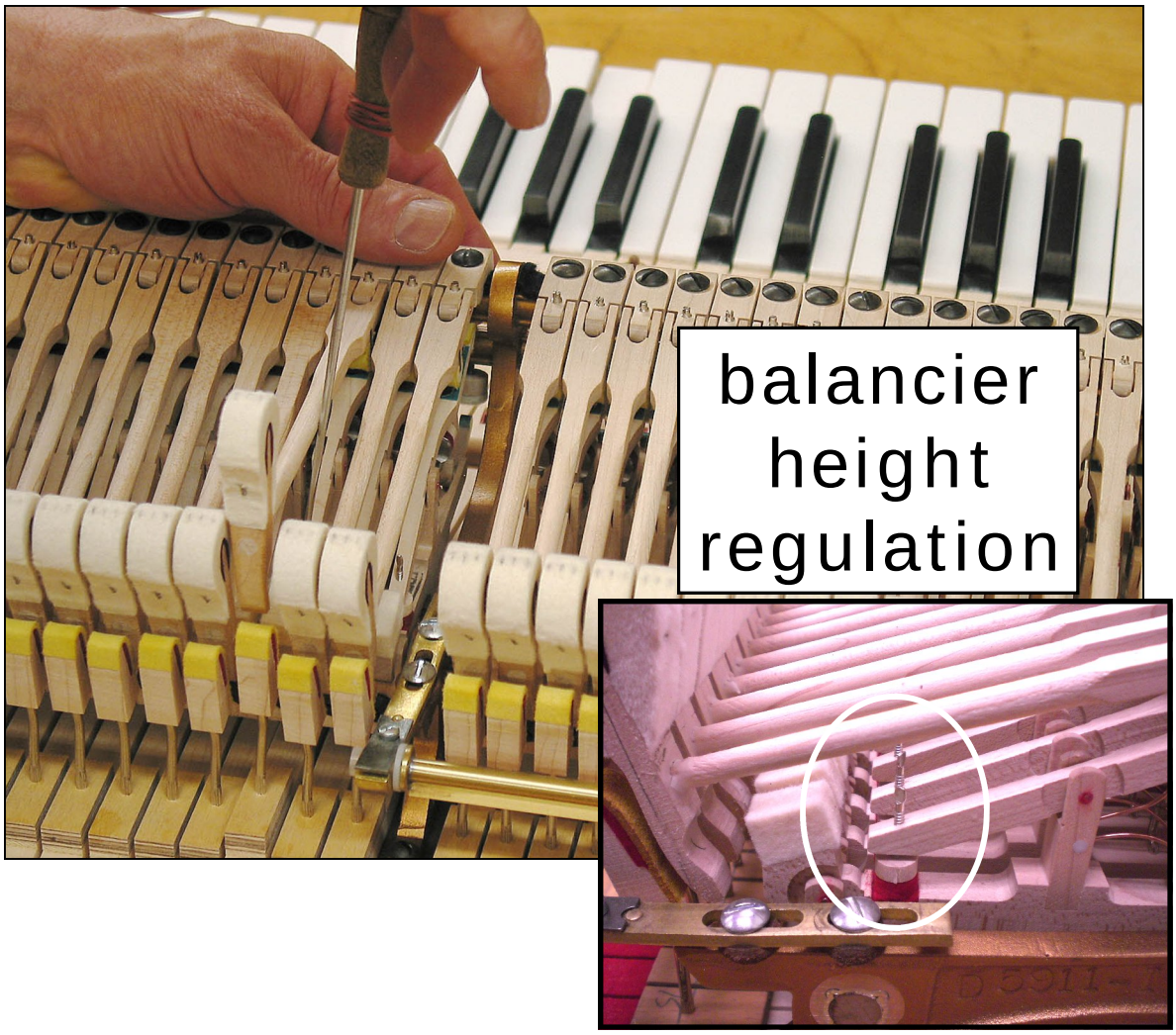
REGULATE BALANCIER HEIGHT

Background: The balancier height is adjusted to eliminate lost motion between the fly and the knuckle while helping the fly to return easily to its rest position.

HOW:

Step 1. Initial adjustment—With the hammershanks lifted off the repetitions, adjust the height of the balancier so that the top surface of the balancier is slightly above the top surface of the fly. The height of the balancier is regulated by raising or lowering the balancier adjustment screw.

Step 2. Final adjustment—Final adjustments are made so that when the fly's tender is depressed and released, the fly returns to its correct position. To eliminate any lost motion, feel for a slight drag as the fly passes under the knuckle. This should cause the hammer to "wink." The factory calls this procedure "rolling the flies."



REGULATE BLOW DISTANCE / SET HAMMER LINE

Background: The blow distance is the amount the hammer travels from its rest position to the string. This distance is measured from the bottom surface of the string to the top of the hammer head. It is adjusted by rotating the capstan screw up or down into the key. Although blow distance can vary within reason, extremes are unproductive. An excessively shallow blow distance will produce a weakened power stroke. An excessively deep blow distance will require excessive key dip, resulting in excess key travel.

The blow distance is originally set in the factory at:

1¾" for Models S M L O A B

1⅞" for Models C D

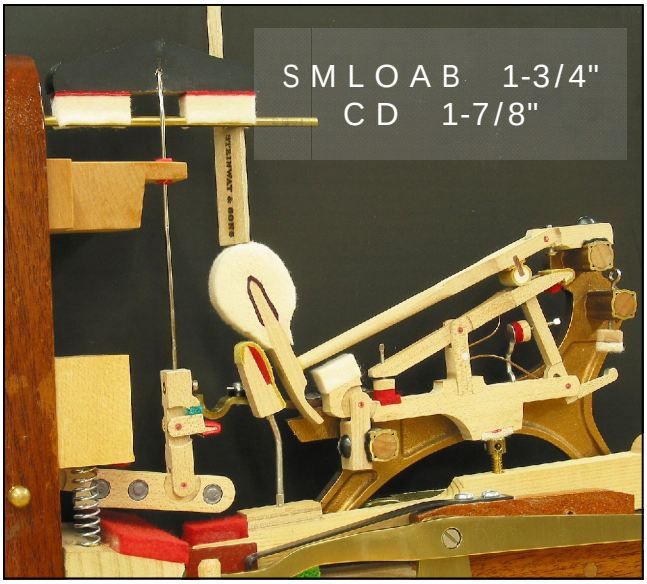
This adjustment should be made in each section of the scale as string height within each instrument continually changes from bass to treble.

Slight variations in the hammer line will increase or decrease the amount of aftertouch without changing the overall key dip. Lowering the hammer line will decrease the amount of aftertouch. Raising the hammer line increases the amount of aftertouch.

HOW:

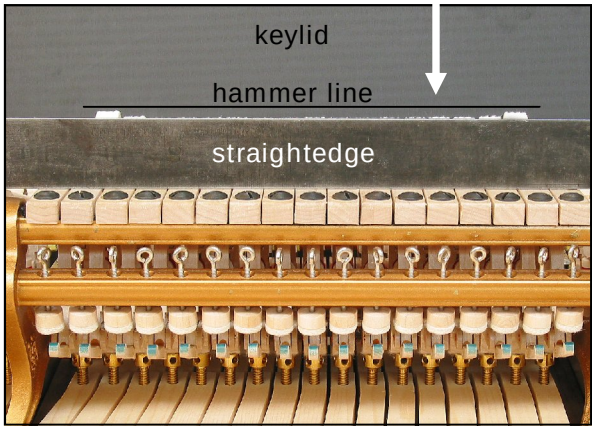
Step 1. Set guides—Adjust the first and last hammer in each section while the action and keyframe assembly is in the piano. Rotate the capstan screw to make this adjustment.

Step 2. Make hammer line—Place the keyframe and action on bench and adjust the remaining hammers within each section by rotating the capstan screws.



Hints:

Use the keylid as a backdrop behind the hammers to visually aid in outlining the hammer line. Place a small straightedge across the hammershank flanges as a horizontal guide.

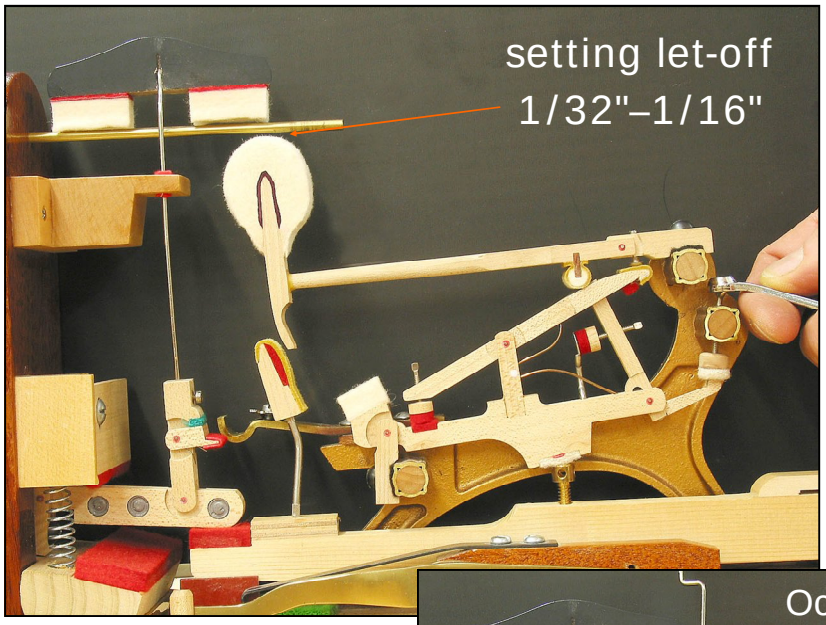


ADJUST LET-OFF (ESCAPEMENT)

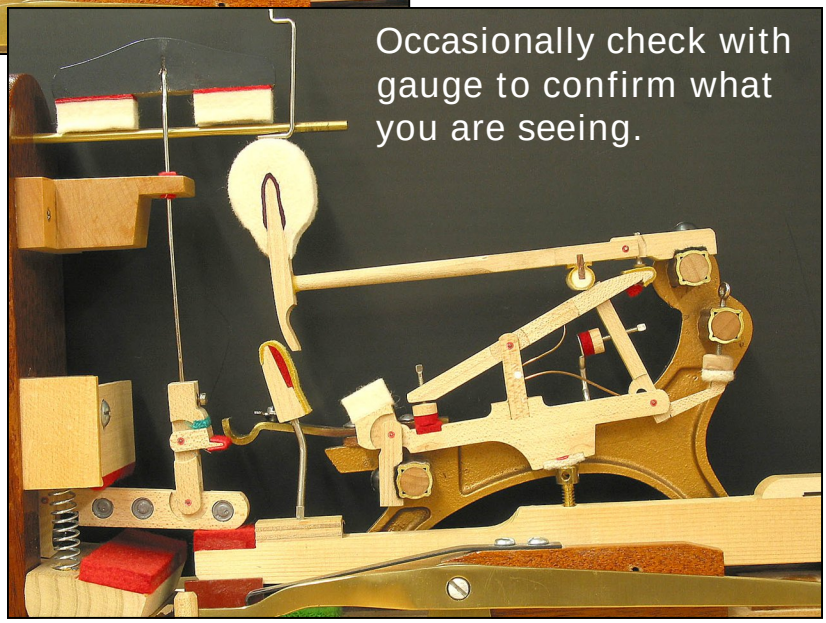
Background: The let-off adjustment is critical to achieve both soft and loud playing. If the let-off is adjusted too far from the string, the hammer will escape too early. This will result in difficulty to control soft playing, at the same time decreasing overall power. The purpose of this escapement is to assure absolute freedom of the hammer during its contact with the strings.

HOW: Adjust the let-off button so the hammer escapes no less than 1/32", and no more than 1/16" from the strings. Rotate the let-off screw as necessary.

Hints: This operation must be done in the piano for exacting regulation, however you may pull the keyframe and action from underneath the damper heads, as a visual aid.



Before adjusting let-off, ensure that the hammer drop is not set so high that it might "eclipse" or interfere with the let-off adjustment.



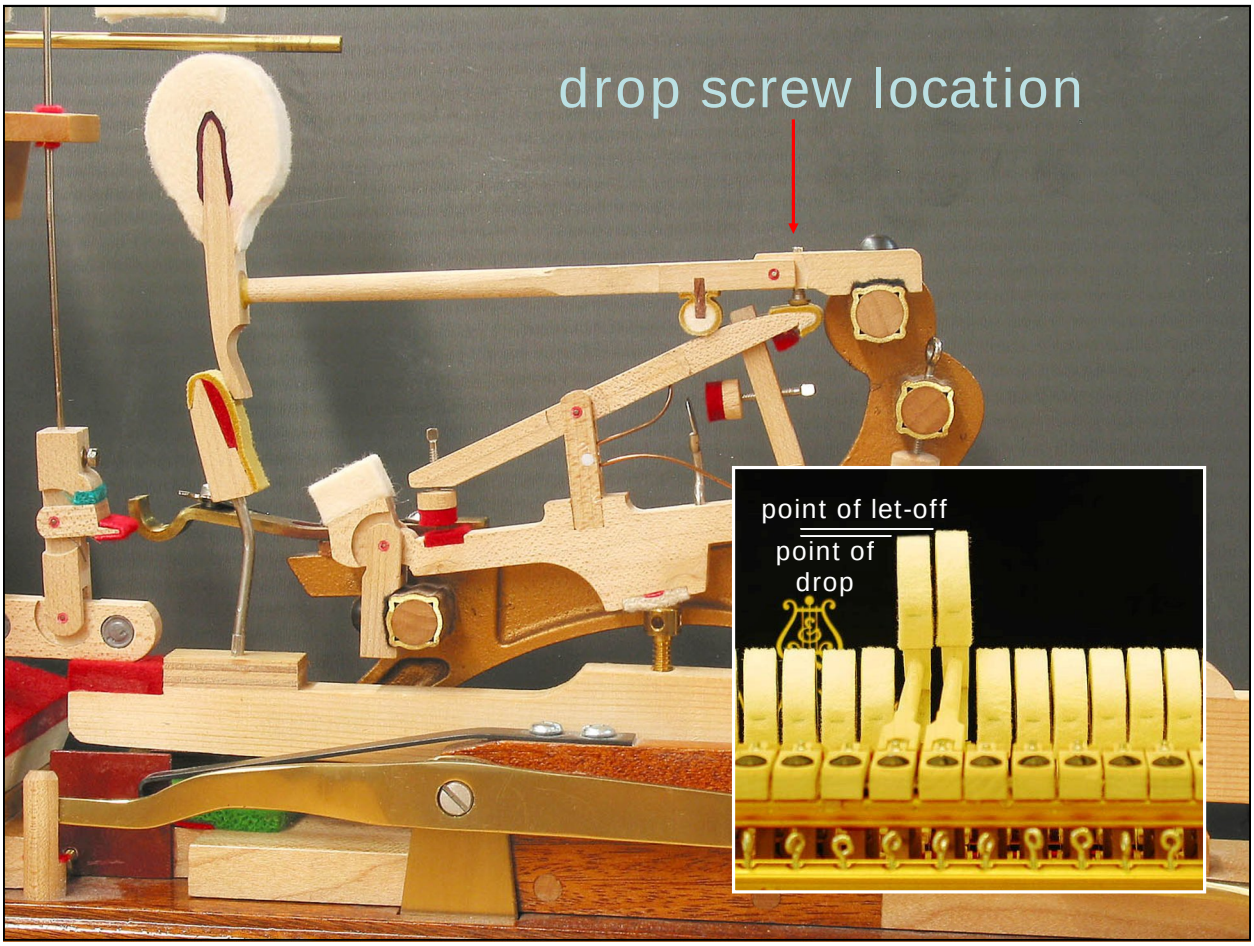
REGULATE HAMMER DROP

Background: Setting the hammer drop is the first escapement of the "double escapement" action. Adjusting the drop screw disengages the balancier from the power stroke of the key, and is set to avoid double striking of the hammer.

The hammer should drop no more than 1/16" from the point of let-off.

HOW: This is adjusted by rotating the hammer flange drop screw up for less drop, or down for more drop.

When checking for the amount of hammer drop, the key must be fully depressed so that the hammer is escaped past let-off and the key is touching the front rail cloth punching.



Drop can be observed and set in relation to hammers that previously have been set to the correct let-off as seen in the inset photo above.

ADJUST KEY DIP

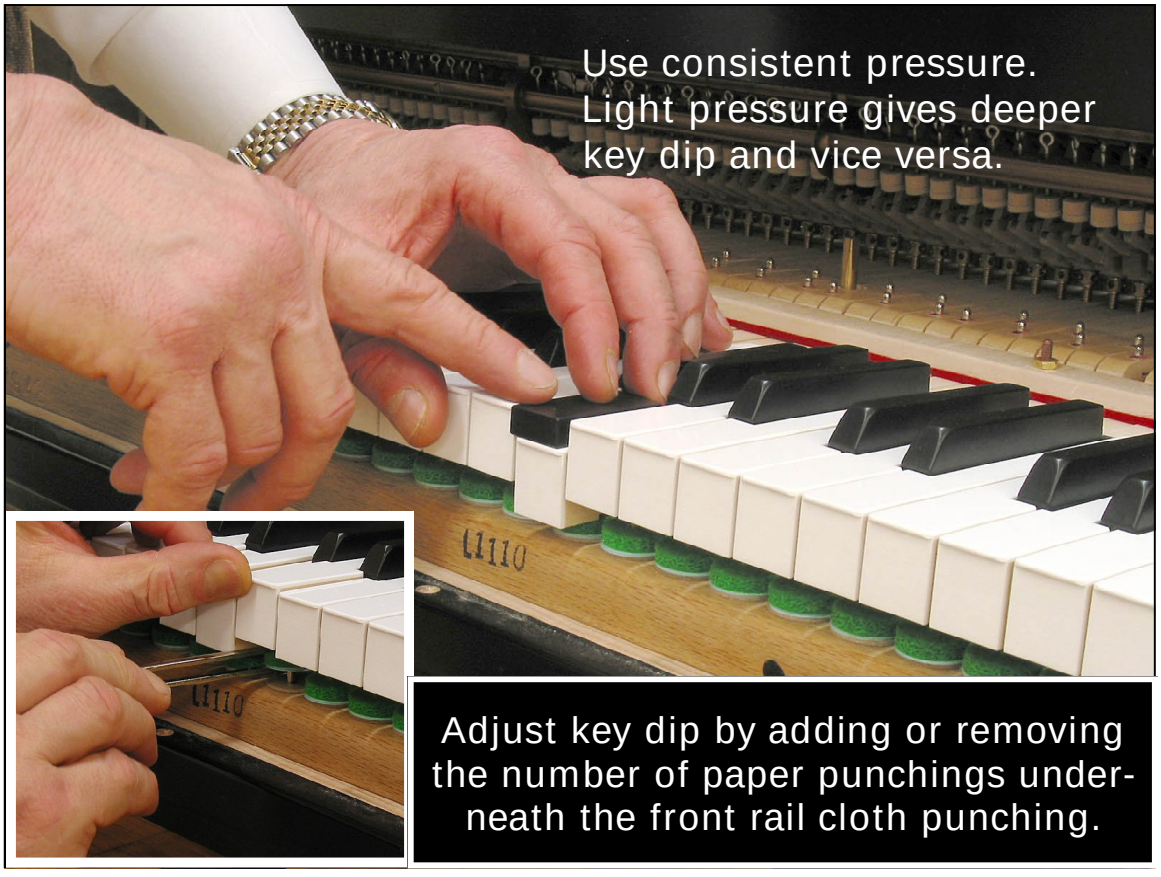
Background: Key dip represents a key's full depth of travel. The factory regulates key dip at .400" for all grands.

It should be noted the key dip may vary within the suggested range of .390 inches and .420 inches for any Steinway grand piano. However, extremely shallow key dip will result in lost power. Extremely deep key dip will result in reduced action performance with the sharps "burying" below the naturals.

HOW:

Step 1. Set key dip on naturals—While using a touch block as a guide, adjust key dip by adding or removing the number of paper punchings underneath the front rail cloth punching. Place the touch block on top of a natural key that has been adjusted for recommended key dip. Depress the key and touch block while rubbing your fingers across the top of the touch block and its adjacent natural key. Make note of this relationship between the adjacent key and the touch block to duplicate this relationship consistently on all naturals.

Also: Depress several natural keys and check for consistent key dip.



Step 2. Set key dip on sharps—When adjusting for key dip on the sharps, duplicate the "amount of aftertouch" from the naturals.

Hints: It is better to use the smallest number of front rail paper punching combinations to avoid sponginess in the keyboard.

It is important to use consistent force on each key when checking for key dip.

Keyblocks should be firmly secured before measuring and adjusting key dip.

ADJUST AFTERTOUCH

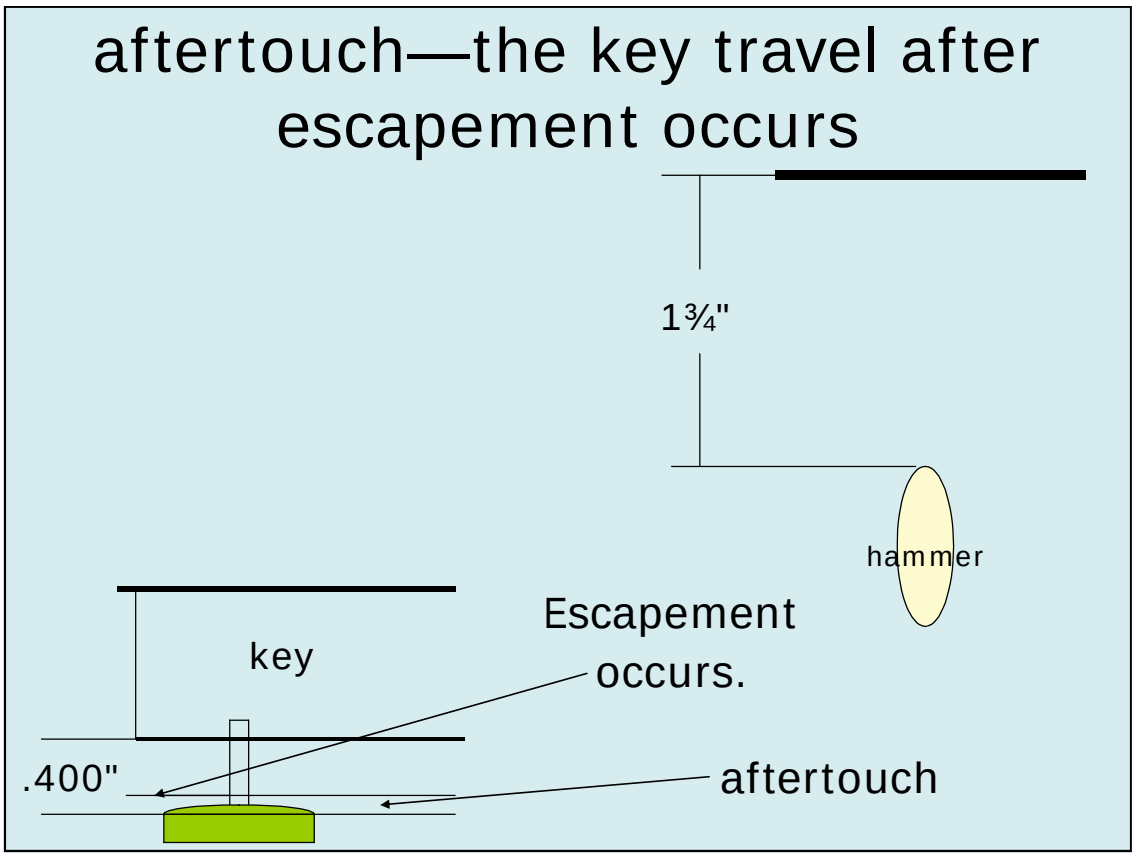
Background: Aftertouch is the amount the key travels past the point of let-off. Key dip establishes the amount of aftertouch; however, aftertouch is also affected by blow distance (capstan adjustment), and key level.

HOW: The amount of aftertouch can vary; however, normally it should be 1/16" to 3/64", or approximately the thickness of a new penny. Adjust key dip to set the amount of aftertouch on the natural keys first, and then duplicate, by feel, this amount on the sharps. Also, be sure to check the fly (jack) travel to ensure that there is some free travel between the fly and the stop felt when the key is fully depressed.

Hints: The amount of hammer rise that follows hammer drop should be the same for the sharps as on the naturals.

Within reason, an increase in the amount of aftertouch throughout the scale can be achieved by raising the hammer line (decreasing blow distance).

Within reason, a decrease in the amount of aftertouch can be achieved by lowering the hammer line (increasing blow distance).

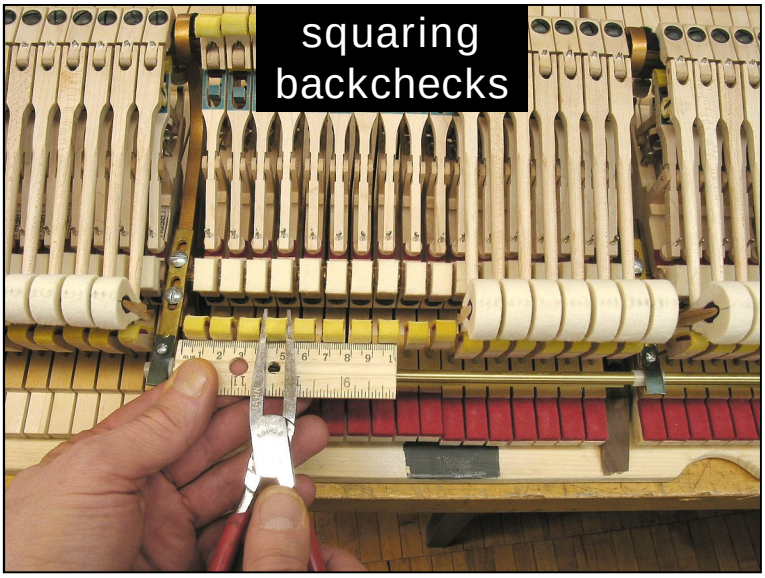


REGULATE BACKCHECKS

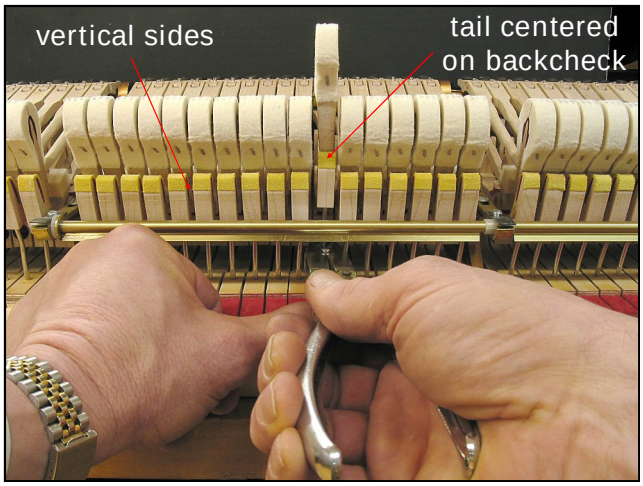
Background: Correct setting of the backcheck / hammer height is crucial for repetition. When properly adjusted, the backcheck will "catch" the hammer, allowing for the fly to return easily under the knuckle, positioning itself for another strike. If the hammer is "caught" too low, it will travel a greater distance, increasing the amount of time it takes for the fly to return under the knuckle.

HOW:

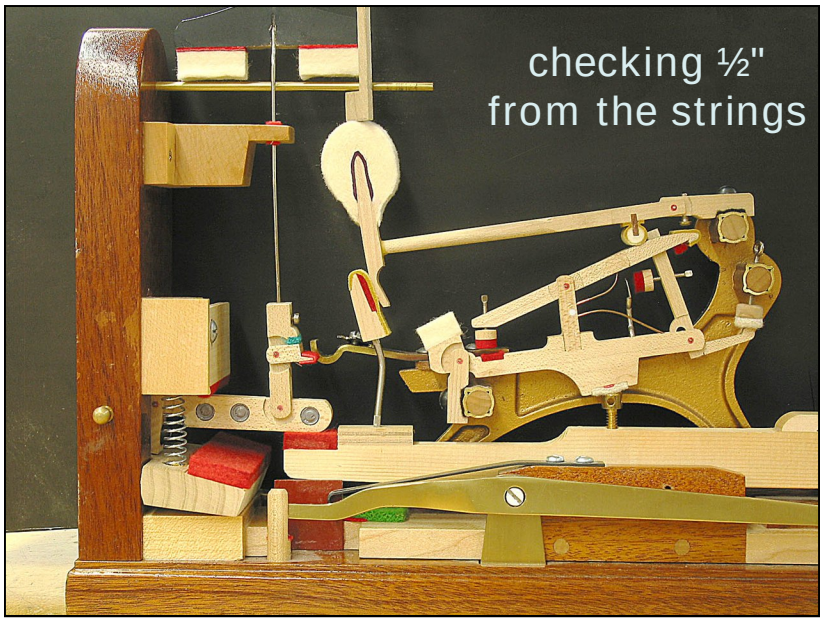
Step 1. Square the backcheck—Using parallel pliers, square the backcheck to the hammer tail. If the backchecks are not square to the hammer, the hammershank center pin will cause excessive wear on the bushing as the hammer is forced to either side during play. This condition will also cause premature wear on the backcheck leather.



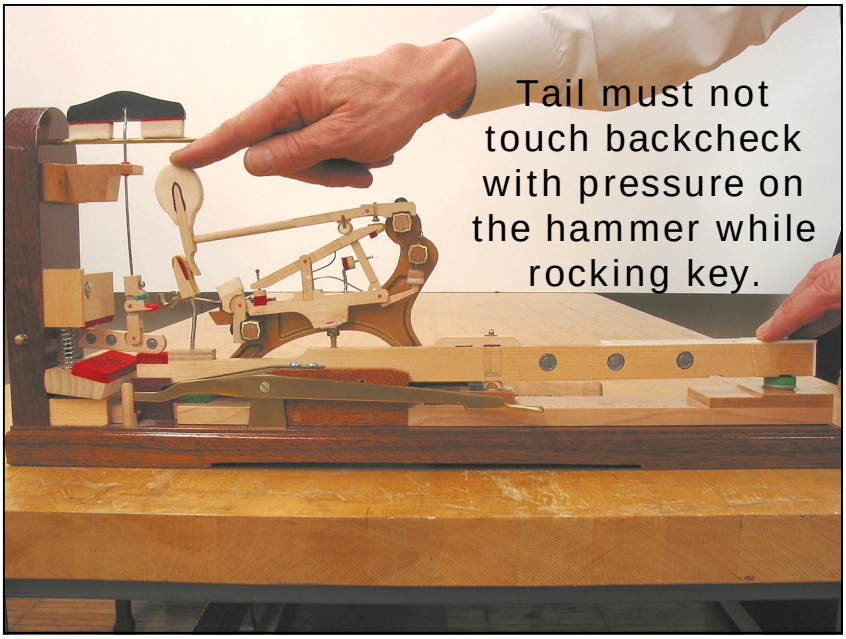
Step 2. Align the backcheck—Using wire-bending pliers, vertically align the backcheck to the hammer molding.



Step 3. Regulate backchecking height—By hand, adjust the angle of the backcheck head so that the hammer is "checked" as high as possible. This height should be consistent throughout the keyboard. Guides should be adjusted with the action in the piano before completing this regulation step on the bench.



Step 4. Check for clearance—Make sure that the backcheck is not too close to the hammer tail, so as to cause interference during play. This can be checked by playing each key with hard blows. The hammer will block, or scrape the backcheck if it is set too close. One can also check for this by depressing both the hammer head and the key simultaneously in a back-and-forth rocking motion. Interference can then be detected if the backcheck is set too close.



SET REPETITION SPRINGS

Background: The repetition spring is designed to aid the repetition assembly back to its rest position, and, therefore, allowing the fly to quickly re-engage for a fast re-strike.

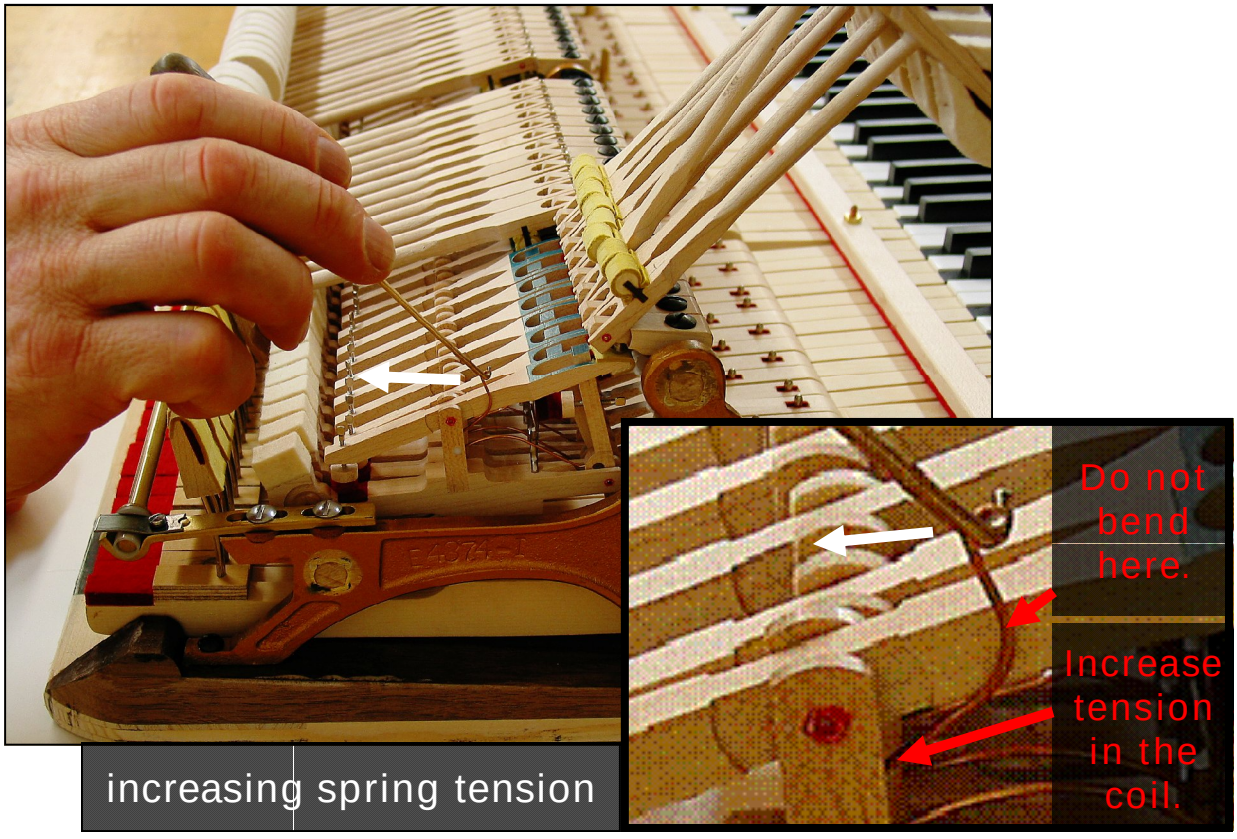
The setting of this spring is crucial for attaining repetition. As the hammer rebounds from the string, the fly is still disengaged. The balancier, which is supported by the repetition spring, supports the hammershank knuckle. This allows the fly to reposition for another strike of the key. Also, the repetition spring aids in forcing the repetition onto the capstan screw and key. This force assists in moving the key towards its rest position.

HOW:

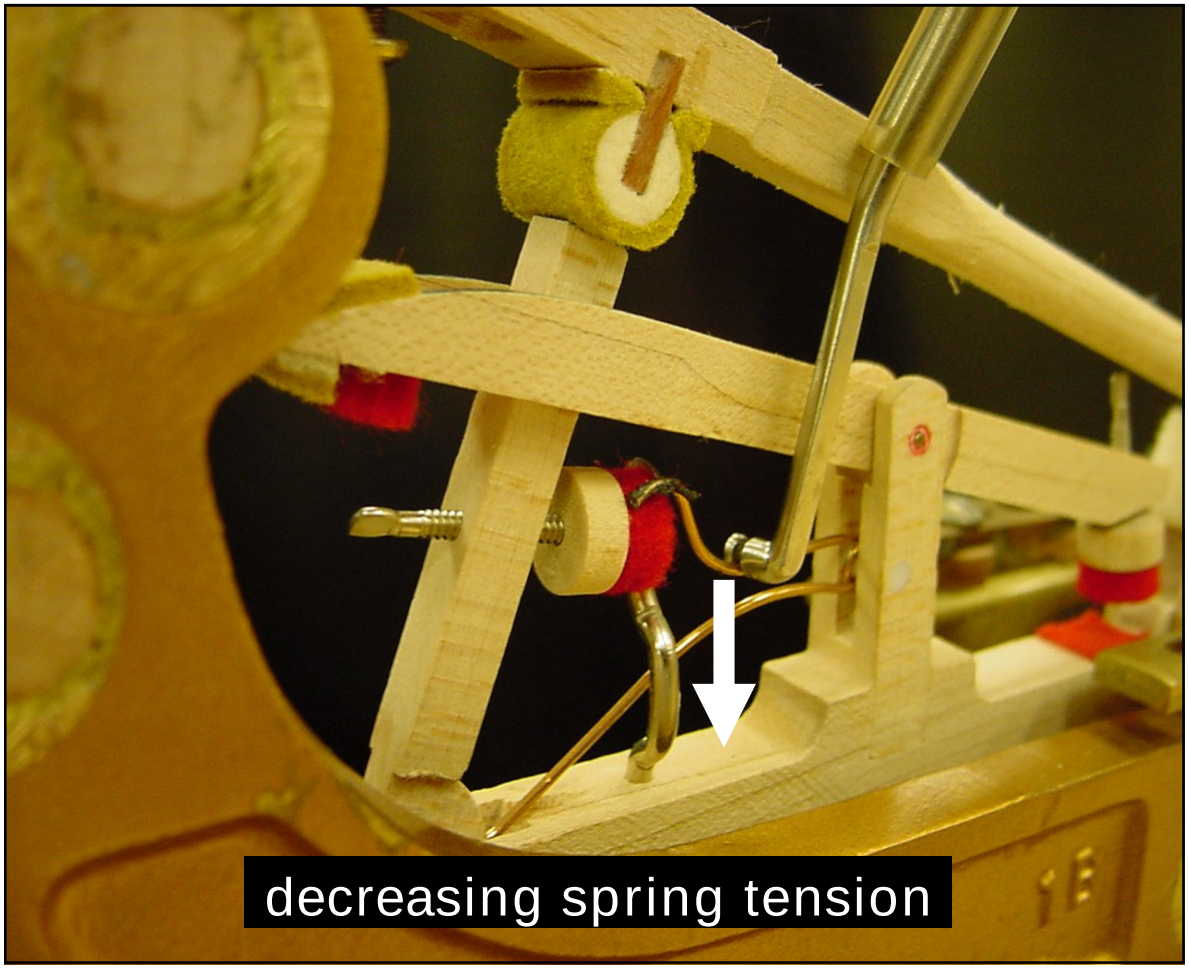
Step 1. Check spring strength—Strike the key with an ordinary blow, allowing the hammer to catch on the backcheck. As the key is slowly released, the hammer should rise away from the backchecks toward the string, until the balancier is stopped by the drop screw.

Step 2. To increase the spring strength—Use a spring hook to remove the top portion of the repetition spring from under the balancier spring grub. Then, use the spring hook to pull the repetition spring upwards to increase the strength. Reinsert the spring under the grub and recheck as described in Step 1.

Spring tools are available from the Steinway Parts Department.



Step 3. To decrease the spring strength—Use a spring hook tool to remove the spring from the grub, and deflect the spring downwards. Reinsert and check as in Step 1. A final inspection of spring settings should be made with the action in the piano.



NOTE: The strength of the repetition spring should be adjusted so that each hammer rises steadily to the point where its motion can be noticed by feel in the key. The motion should be steady and quick, but not snappy. Generally, the speed at which the hammer rises is set slower in the bass and progressively faster in the treble. This will accommodate for the different masses of individual hammers.

ADJUST KEYFRAME SHIFT SCREW

Background: The keyframe shift screw is adjusted so that when the keyframe is in its shifted position, the left string of the trichords is missed by the hammer.

The keyframe shift screw can also be adjusted for individual requirements. It is acceptable for the shift of the keyframe to vary. Some players request not to have a full shifting of the keyframe so the hammer does not clear the left string of the trichord. Rather, a minimal shift is also acceptable so the player uses only a different part of the hammer during play. This results in a tone of different color, rather than a change in volume. In any case, hammers should be well spaced so string-by-string voicing can be achieved.

HOW: Adjust by rotating the keyframe shift screw, which is located on treble side of rim in the keyboard cavity. Determine how much the screw needs to be adjusted by observing the position of the hammers in relation to their corresponding strings when the keyframe is in its shifted position.

Older Steinways may have the keyframe shift screw located in the treble keyblock.