Repetition

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Achieving great repeat rates from verticals

- Realize that the key must return fully to the rest position before the next note is available
- Too much after touch is the death knell
- You can get it better by
    - Tightening the hammer flange center
    - Loosening the hammer return spring
    - Loosening the wippen flange center
    - Strengthen the jack spring
    - Lubricate the usual friction points and don't miss the butt leather and top of the jack
    - Check for any unusual impediments for the return of the key and jack

Achieving really great repeat rates from the grand action

- Watch for these things in the **jack**:
    - Jack too high in the repetition lever window
        - Brand new pianos generally have particularly strong rep springs
        - Turning down the pressure of the repetition springs will change the relationship of the jack in the window, because weakening the spring un-compresses the button. Because the pressure is reduced in the back of the wippen, the height is increased in the front.
    - Jack dragging on the forward limit felt
        - This will happen if there is too much after-touch
        - This will happen if there is too much let-off
    - Jack dragging on the side of the window
    - Too much friction at the jack action center
        - 2-3 grams max
- Too much **after-touch**
    - Dip, let-off, blow
- **Drop** too low
    - 1/16 below let-off
    - The two tenders must be coordinated: the jack tender meets the let-off button at the same time that the repetition lever meets the drop screw
    - This deters power and control
    - Low drop affects the feel. High drop creates no after-touch.
- **Repetition spring** too weak

    - If the spring is too strong, the hammer will pop up too fast, and this can be felt at the key.
    - LeRoy Edwards describes in the treble is like a young man getting out of a chair. The treble is like an older person getting out of a chair, and the bass is someone using a chair assist.
    - Does the speed of the repetition spring directly determine the speed of the note? No. Increased speed only gets in the way of the player. If the repetition lever is being pushed smartly to the drop screw, after that it doesn't matter.
- **Back-checks**
    - Checking at the right height.
        - At let-off, the tail is about 1/8" above the back-check.
    - There is a relationship between drop and checking distance.
    - If the drop is raised, raise the checking distance to match.
    - Be sure that the angle of the back check matches the angle of the hammer tail.
    - Is the back of the hammer tail slick?
        - Make two or three strokes with 60 grit
    - Is the tail the right length relative to the back check height
    - Is the back check slick
    - Is there drag on the way to the string?
        - Press down the shank while pressing down on the key.
    - Is there any play at the key balance hole?
    - Is there any play at the back check wire hole?
    - Watch for sharp edges on the hammer tail that cause a wear spot on the back check that creates a bounce from the hammer
    - Can you push the hammer too far down the back check?
- **Relationships**
    - Realize that there is a relationship between the checking height and the drop height (5/8-1/4=3/8)
    - Realize that the repetition spring needs to be compressed so that it will work. Nothing will move without pressure.
    - As you raise the checking height, you have to increase the distance of the drop.
    - The key must lift a minimum of 20 grams for return.
- **Guidelines**
    - To a point the shorter this distance the faster the time to reset
    - This distance can be too short
    - The hammer must rise a certain distance out of the back check to the drop screw
    - The shorter the distance, the faster the spring must be.
- It's not the way it works
    - Realize that we adjust the action regulating the hammer rise when in reality the hammer stays somewhat stationary while the wippen and key return toward the reset button
    - The key must lift a certain amount of weight to return successfully

        - Minimum up-weight for the grand action is about 20 grams
        - Be sure you have resolved for friction issues before weighing keys
- Two tests for successful return of the jack under the knuckle
    - Drag your finger across the top of the jack and feel for the sharpness of the edge. The difference should be about a paper's width thickness.
    - Wink the hammer.
    - Slowly operate the key return and watch the jack under the knuckle. You may need more room at the top of the jack than you think.
    - Direction of nap on the knuckle
        - Smooth let-off: nap towards player.
        - For better repetition, the nap goes away from the player.
        - The choice can be either way: just make it consistent.
        - After wear on the knuckle, there is no nap to consider anyway.
    - The Roger Jolly method of relational regulation.
        - If the knuckles are worn out, replace the knuckles. The parts have to be free enough to operate.
        - Operate the jack and you can feel the jack rub the knuckle on the way back. You can set the speed.
        - Turn the repetition lever screw so that the jack returns freely under the knuckle. Then turn the screw so that there is minimal drag of the jack on the knuckle.
        - After doing this, check the hammer line. It will change slightly.
- A trap on the way to great repetition
    - To get the smooth let-off we like, we tend to put the jack to the front of the molding. In trying to gain the ultimate in low friction have you set the jack too far toward the player? Remember that the knuckle moves away from the player during its rise to the string and during fast/deep dip repeating, the jack stays toward the player, therefore the jack adjustment must not be too far forward.
    - Have we lost something? In our zeal to make the action seemingly frictionless, have we lost the traction of the jack to the knuckle and therefore losing power?
        - There is sometimes noise of the jack button landing on the jack spoon due to thinner felt.
        - The knuckle moves the jack away from the player. With a hard blow, watch the red felt on the spoon and see how it pushes the spoon away from the player. Radically thin felt cannot compress, causing the jack to slide under the motion. This sliding motion does not give a complete push, in contrast to the way it should move by grabbing and compressing and pushing on the felt until it's time to let go.
        - Consequently, by replacing these buttons with thicker felt, the power will be increased.