

## How A Piano Works

Essentially, when a piano key is pressed down, its tail pivots upward and lifts a lever that throws a hammer against the strings for that key's note. At the same time a damper is raised from these strings, allowing them to vibrate more freely. The following is a much more detailed description of how the action works; the numbers in parentheses refer to the accompanying diagram of the action of a grand piano.

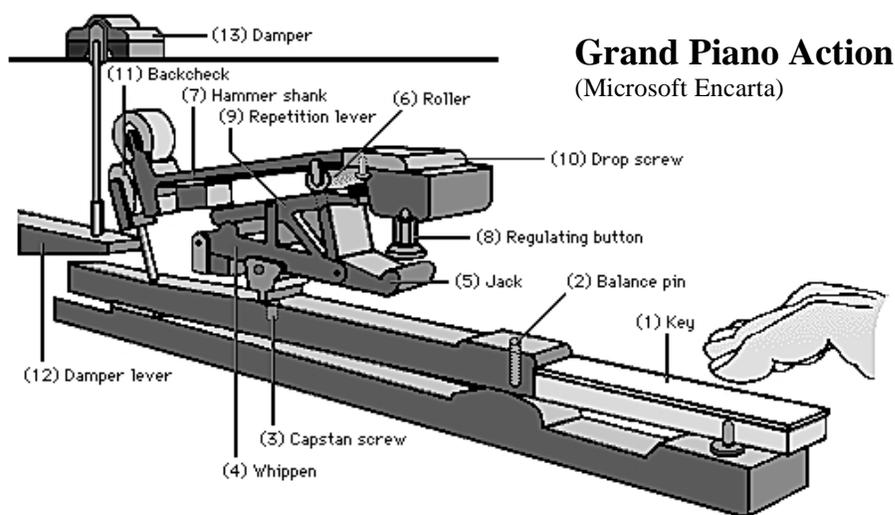
The piano key (1) is a lever that pivots on a balance pin (2). When the player depresses the key, the tail rises and the capstan screw (3) in the key pushes up the whippen (4), which is hinged. The free end of the whippen rises, taking with it an L-shaped piece called the jack, or escapement lever (5), and the repetition lever (9).

The jack pushes the knuckle, or roller (6), a roll of felt that is fixed to the hammer shank (7); the hammer thus rises. The jack's upward motion is stopped when its protruding end hits the regulating button (8). The hammer flies up away from the jack and strikes the appropriate strings. The repetition lever (9) also rises, but only until the end where the jack passes through it and touches the drop screw (10); this lever stays raised until the key is released.

The hammer falls back, but only partway. It is stopped by the knuckle (6) hitting the raised repetition lever (9). The jack (5) can thus slip back under the partially raised hammer shank and into its original position. At the same time, the backcheck (11) keeps the hammer from rebounding against the strings.

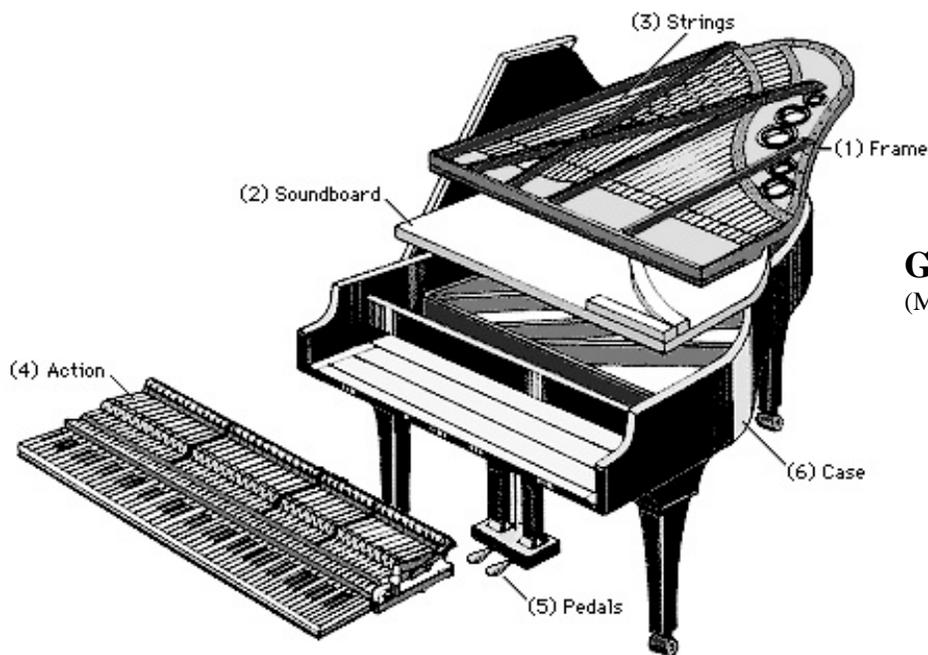
If the key is partly released, the hammer moves free of the backcheck, and the repetition lever stays raised. If the player again depresses the partially released key, the jack (5) can once more push the knuckle (6) and hammer shank (7) upward. (This system allows rapid repetition of notes before the key and hammer have time to return to their original positions. It was an important improvement over early, simpler piano actions.)

Meanwhile, the tail of the key has also pushed up the damper lever (12), which lifts the damper (13) off the strings for that key. When the key is even partially released, the damper falls back onto the strings and silences the note.



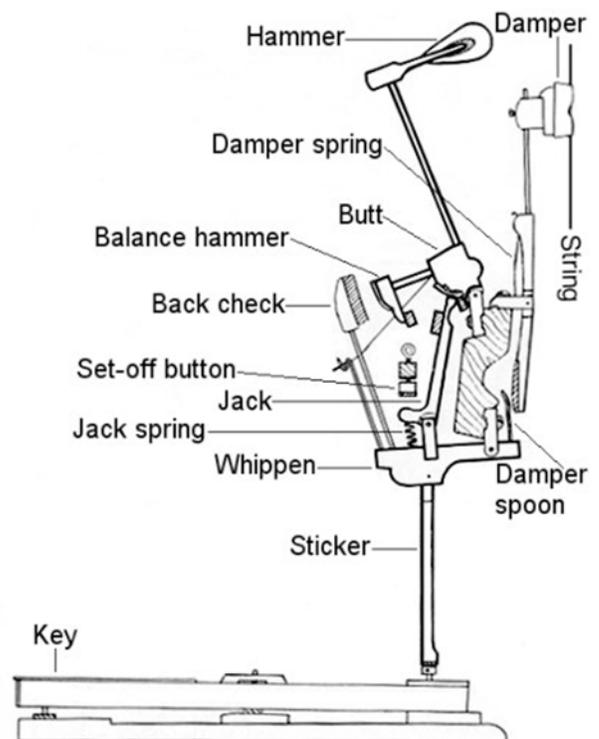
When the key is fully released, all parts of the mechanism return to their original positions because of gravity. Unlike grand pianos, upright pianos cannot rely on gravity to cause everything to return to place. In a grand piano the action sits horizontally on the key; in an upright piano the action is adapted so that it sits more or less vertically. Because it cannot completely rely on gravity, it includes various springs and small strips of cloth to pull some of the action parts back into place.

"Piano (musical instrument)," Microsoft® Encarta® Online Encyclopedia 2006  
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**Grand Piano Diagram**  
 (Microsoft Encarta)

**Vertical Piano Action**



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