ZWILLING J.A. HENCKELS TWIN® BEAUTY NAIL CLIPPER

A mechanism description
By Jack Zhou

1.0 Introduction

The Zwilling J.A. Henckels TWIN Beauty nail clipper is a brushed stainless steel fingernail trimming device. Using a jaw-like mechanism, it is able to cleanly cut fingernails to a desired length and contour. The nail clipper is about 2.25 inches long and 0.5 inches wide. It is unique from other nail clippers in that it can be folded into a compact storage position (figure 2). In this position, the blades are unable to move, and the nail clipper is only an eighth of an inch thick. The closed blades make the clipper safer to handle, and the low height makes it easy to store. There are three main components to the nail clipper: the housing, the lower blade, and the handle.

Figure 1 *clippers ready to be used. The 3 major parts are labeled. For future reference, the left side of the picture is the front of the clippers and the right side is the back.*

Figure 2 *clippers in the compact storage position*

2.1 The housing

The housing forms most of the body of the nail clipper. It determines the length, width, and height of the clipper. The housing consists of a few components: the upper blade, the hook catches, the housing hinge pin, the spring, and the spring holding pin. They are shown below in figure 3:

Side view:

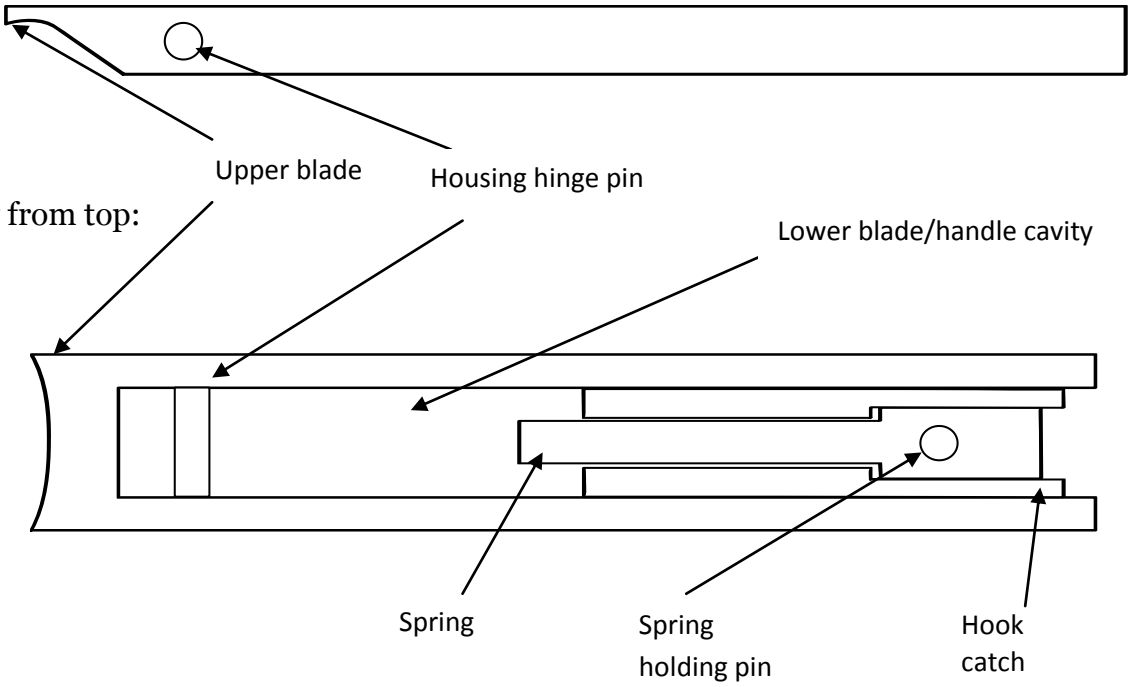


Figure 3 *diagram of the nail clipper housing from two different viewpoints. The lower blade/handle cavity is not really a component, but is an important feature.*

The upper blade is hooked down and comes to a very sharp edge. The lower blade comes up towards the upper blade when the tip of the nail is in between them. The blades slice through the nail and the tip is sheared off. The front of the blade is curved into the clipper (this is in the top view of figure 3), so that it can cut the nail to follow the natural contour of the fingertip.

The hook catches are two metal protrusions that the hook on the back of the handle can grab. They hold the handle down when the nail clipper is in storage mode.

The housing hinge pin is a cylindrical pin that acts as a hinge for the lower blade to rotate around. The ends of the pin are flush against the sides of the housing.

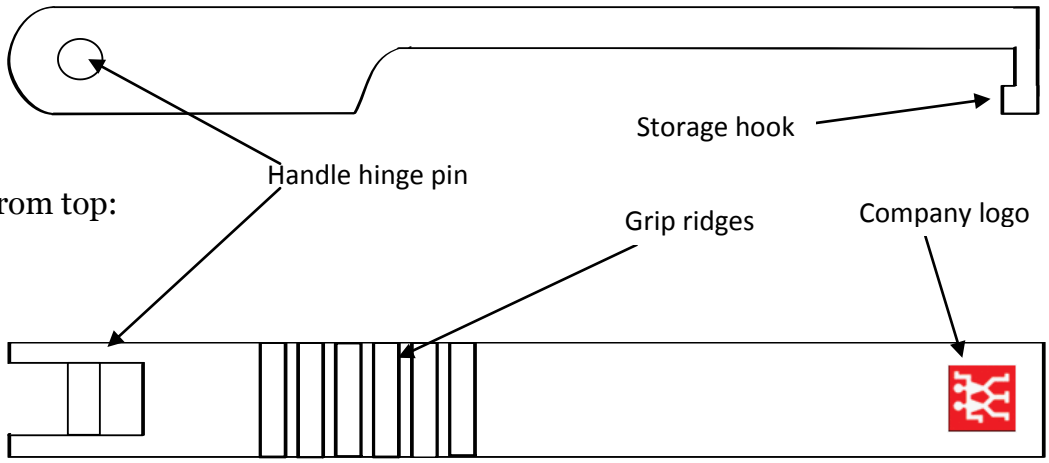
The spring is a thin piece of stainless steel, attached to the housing only by the spring holding pin. The steel is bent at a slight upwards angle, but is flexible and can be pushed down. The tip of the spring is in constant contact with the spring notch of the lower blade. The purpose of the spring is to provide an upward force against the lower blade so that when the user releases pressure on the handle after pushing it down to close the blades, the blades will return to their original open position. The spring is held in place by the spring holding pin, which is just a pin that rivets the spring to the housing.

The lower blade/handle cavity is a completely hollow area in the housing. This is to make space for the lower blade, as well as to store the handle when the clipper is closed.

2.2 Handle

The handle is a flat piece of steel that is used for leverage to cut the nail. It is a little shorter than the whole nail clipper, and a little narrower as well. It has these features: the handle hinge pin, the storage hook, and the grip ridges.

View from side:



View from top:

Figure 4 *diagram of the nail clipper handle from two different viewpoints. The pattern of the company logo is etched into the handle.*

The handle hinge pin goes into the handle hinge pin slot on the lower blade. This allows the handle to rotate around the lower blade, and also allows it to go from the storage configuration to the clipping configuration. The mechanism by which this happens will be explained later.

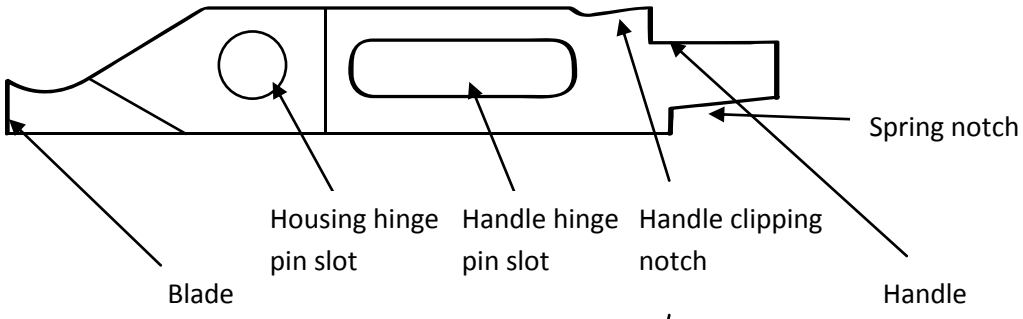
The storage hook is designed to hook around the hook catches in the housing. When the hooks are engaged, they hold the handle in a position where its top is flush with the top of the housing.

The grip ridges are rectangular indents in on the top of the handle. The indents increase the friction between the handle and the user's thumb. The user puts his thumb on the ridges to pull the handle back and disengage it from the storage hook.

2.3 Lower blade

The lower blade is the complement to the upper blade. It is about half the length and the same height as the housing. There are a few features of the lower blade that are worth noting: the lower blade itself, the housing hinge pin slot, the handle storage notch, the handle clipping notch, the handle hinge pin slot, and the spring notch.

View from side:



View from top:

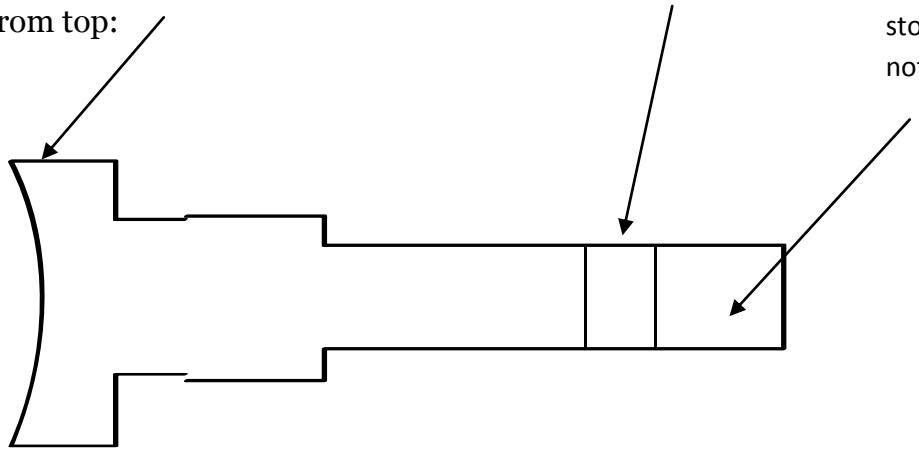


Figure 5 *diagram of the lower blade from two different viewpoints.*

The lower blade is a mirror image of the upper blade. It curves up to form a sharp edge. The front of the blade also curves inward, as shown in the top view in figure 5. When the user squeezes the handle, the lower blade swings up towards the upper blade, shearing the fingernail.

The housing pin slot holds the housing hinge pin, but allows it to rotate. This allows the lower blade to rotate around the pin until either the blades come in contact with each other or until the bottom of the blade hits the bottom of the housing.

The handle storage notch is the default position for the handle when the clipper is folded. When the front of the handle is in this notch, the top of the handle is flush with the top of the lower blade.

The handle clipping notch is forward of the storage notch, and is also sloped up slightly due to the different angle of the handle. When the handle is in this notch, the user will have greater leverage to clip nails.

There is another slot for the handle hinge pin. This slot is the same height as the other slot, but is much longer. This allows the handle pin to slide back and forth, allowing the handle to rest on either the clipping or the storage notch.

The spring notch is an indent on the bottom of the lower blade. The front tip of the spring fits in this notch, and pushes the slot upwards, rotating the blade around the housing hinge pin slot and opening up the blades that cut that nail.

3.0 Directions for use

The clippers will initially be in the storage configuration. Place your thumb on the grip ridges of the handle, and slide it back until the storage hooks disengage. Then, lift up the handle and slide it all the way forward, until the hinge pin touches the front of the slot. The handle will be resting in the handle clipping notch of the lower blade.

Place the tip of the fingernail to be cut in between the two blades, pushing it forward until the desired nail length can be achieved. Then, place the index finger of the other hand on the back end of the bottom housing, and the thumb on the back end of the handle. When you squeeze the two together, the lower blade will rotate around the housing hinge pin. The lower blade will move up towards the upper blade, slicing the nail that is in between them and shearing off the nail. Since the distance from end of the handle to the hinge pin is longer that the distance from the blade to the pin, the cutting should take little effort due to the principles of lever action.

Once the nail is cut completely through, release the handle. The blades should reopen due to the force of the spring pushing up the back end of the lower blade. Shake the nail clipping out from between the blades, and move on to another part of the fingernail and clip again. Repeat this process until the fingernail is rounded and smooth. Then, repeat for all the fingernails that need cutting.

After all the nails are clipped, the clipper can be folded down into its storage position. Pull the handle all the way back, then push it down until it is flush with the top of the housing. Push the handle forward until the hooks engage the hook catches in the housing. The pressure from the spring should hold it in place.