

## Instructions for Installation of The Truitt Sharping Lever®

### Introduction and Description

A long period of research and development with detailed planning, experimentation, and revision, now brings this new lever to the folk harp world. These improvements over other levers has qualified this invention for completion of the legal patent process. The Truitt Sharping Lever® is machined by state-of-the-art, computerized, numerically controlled equipment to tolerances of .003-.005 accuracy. The lever is made of hard brass in a solid configuration, which uniquely provides true tone for any note played when it is engaged. A 24-karat gold-plating process ensures its rich, glowing appearance is retained over the years. I proudly invite you to purchase the lever and let its feel, appearance, and form speak for itself!

#### The Base

The base is available in four configurations. The most commonly used are [K] and [B4]. The notched base [K] is used with strings 3.5" to 12" long (Fig. 19A). The four-slot base [B4] is used with strings over 12" long (Fig. 19B).

The less commonly used bases are for neck designs where there is little wood under the bridge pins. These bases have the bottom two slots removed. Use the one-slot notched base [K1] with 3.5" to 12" strings and the two-slot base [B2] for longer strings (not shown). The final base configuration is the notched base [K2] with the top slot removed; the base is attached with screws in the two bottom slots only. This base is made for those cases where the harpmaker has decided to use zither pegs rather than through tapered pegs. (Not shown).

#### The Handle

Two handle configurations are offered: a heart-shaped end [H] and a round-shaped end [R]. In each case, the edges have been smoothed over for the harper's comfort. A suggestion: use the heart shape for C's and F's for immediate recognition and the round shape for other strings (or vice versa).

#### The Fret Pin

Fret pins are made of either brass [B] (Fig. 11B) or black delrin [A] (Fig. 10A). Use the brass fret pin [B] with all monofilament nylon, gut, and wrapped nylon/nylon. Use the delrin fret pin [A] on all metal and metal core and metal wrapped strings. When these fret pins are used with the stop, the medium fret pin fits most string sizes. In exceptional cases, all fret pins can be purchased in three sizes. Contact me for further information if you think you might need this specialty.

#### The Stop

The stop (Fig. 18) is added to the base for any wrapped string whose overall diameter (o.d.) size is .040"+ but only when they are wrapped strings. The stop holds the string

firmly against the fret pin. There are three sizes: small [S] (use with wrapped strings having less than an overall diameter of .055"); medium [M] (use with wrapped strings .055" to .090" diameter); large [L] (use with wrapped strings .091" to .130").

### Easy Installation Procedures

A unique advantage for the installer is that the Truitt Sharping Lever® does not need to be removed to drill holes and secure it after correct placement is located. The string lies along a line between the slots used to fasten the lever to the neck. Therefore, the lever once positioned correctly does not need to be moved to install it.

If you are not adept at woodworking, using tools or taking precise measurements, I do suggest you have a professional (woodworker or harpmaker) do the installing. But, if you take your time, *carefully read, and follow these directions*, you should be able to do this. Remember that help is a phone call away!

If you are replacing levers on a harp, remove all old levers. Sand any rough spots around the old screw hole(s) as well as any indentations made in the finish. The new levers need to sit flat on the neck, not rock back and forth. In most cases, the new lever will cover over any previously drilled holes. Your choice of which base slots to use when drilling for the new screws, might be determined by these holes. Avoid overlapping the holes.

First, set the heights of the bridge pins.

**Preparation.** The bridge pin groove holding the string should be approximately 1.1 cm or 1/2" in height. When making the harp, drill the bridge pin hole slightly deeper than required to allow for fine adjustments. You may need to pry up the bridge pins to the correct height. It is easy to tap them in if they are too high.

**Information:** The recommended Truitt Sharping Lever® installation method uses two (2) button-head Torx® screws placed diagonally opposite in the base slots. The unused slots exist as options for later use. If there is insufficient wood under the shortest strings, order the K1 base (one screw will hold the lever). If the harp has zither pegs rather than through-tuning pegs you will need to order the K2 base for strings less than 12" long (two screws in the lower two slots will hold the lever). If there is insufficient wood below the middle harmonic curve (strings 12"+) order the B2 base (two screws in the upper two slots will hold the lever).

In Figure 1, D is a "cat's paw" tool I use for lifting the bridge pin with a wooden block (E) for leverage and protection of the neck.

**Your action.** Place the harp on its side on a padded table. Some people prefer to work with the harp standing upright. Do what works best for you. Try both

positions to determine the easiest method for yourself. For most of the operations (with harp lying down) it is best to stand at the top of the harp near the table edge. Pre-set the bridge pin heights at 1/2".

**Caution.** When there are too many wraps of the string around the tuning peg, it will cause a downward angle between the bridge pin to the tuning peg. This could produce tension on the bridge pin causing it to slide down into the hole. Reduce the number of wraps by loosening the harp string, pull it through the peg more, and re-wrap. Cut off any excess string.

Second, measure each string's vibrating length.

**Your action.** Use a retractable measuring tape, determine the vibrating lengths of all strings that will receive levers, and note the information on paper.

**Information.** The approximate actual semi-tone point is 1/18<sup>th</sup> the vibrating length of the string. A mathematical computation is achieved by multiplying each vibrating length by .0555. (See table below for approximations of sharpening lever points.)

Table of Sharpening Point Placement Approximations

V.L	# point	V.L	# point	V.L	# point
3-1/2"	3/16"	25-7/8"	1-7/16"	48-3/8"	2-11/16"
4-1/2"	1/4"	27"	1-1/2"	49-1/2"	2-3/4"
5-1/2"	5/16"	28-1/8"	1-9/16"	50-5/8"	2-13/16"
6-3/4"	3/8"	29-1/4"	1-5/8"	51-3/4"	2-7/8"
7-7/8"	7/16"	30-3/8"	1-11/16"	52-7/8"	2-15/16"
9"	1/2"	31-1/2"	1-3/4"	54"	3"
10-1/8"	9/16"	32-5/8"	1-13/16"	55-1/8"	3-1/16"
11-1/4"	5/8"	33-3/4"	1-7/8"	56-1/4"	3-1/8"
12-3/8"	11/16"	34-7/8"	1-15/16"	57-3/8"	3-3/16"
13-1/2"	3/4"	36"	2"	58-1/2"	3-1/4"
14-5/8"	13/16"	37-1/8"	2-1/16"	59-5/8"	3-5/16"
15-3/4"	7/8"	38-1/4"	2-1/8"	60-3/4"	3-3/8"
16-7/8"	15/16"	39-3/8"	2-3/16"	61-15/16"	3-7/16"
18"	1"	40-1/2"	2-1/4"	63"	3-1/2"
19-1/8"	1-1/16"	41-5/8"	2-5/16"	64-1/8"	3-9/16"
20-1/4"	1-1/8"	42-3/4"	2-3/8"	65-1/4"	3-5/8"
21-3/8"	1-3/16"	43-7/8"	2-7/16"	66-3/8"	3-11/16"
22-1/2"	1-1/4"	45-1/8"	2-1/2"	67-1/2"	3-3/4"
23-5/8"	1-5/16"	46-1/8"	2-9/16"	69-11/16"	3-7/8"
24-3/4"	1-3/8"	47-1/4"	2-5/8"	72"	4"

• **CAUTION.** These are approximations in inches for the placement of the sharpening levers. Be sure to use an electronic tuner to make accurate adjustments prior to drilling holes to secure the lever to the neck.

Third, locate approximate semi-tone points.

**Information.** Some people prefer to install Truitt Sharpening Levers® from the longest string to the shortest and some vise-versa. For this paper, we will explain installation beginning with the longest string.

**Your Action.** Locate the semi-tone point you have computed or obtained from the chart. Measure from the bridge pin's center toward the soundboard. Mark this point lightly on the string with a fine-point marker. (Fig. 8).

Fourth, prepare and place lever on neck under string.

**Information.** For our purpose we assume that the longest strings will be wrapped. The Truitt Sharpening Lever® will be fitted with a stop. It is not necessary to unscrew this stop when fitting the lever in place.

Fig. 4 shows how I use felt strips to stop the sympathetic vibrations (overtones). They can be easily moved to "open" the string being fitted with the lever.

**Theory.** Any slight tension increase on a string will cause the actual, exact, semi-tone point to differ (be sharper) slightly from its mathematically determined point. The height of the bridge pin will cause a tone change, so be sure the bridge pin heights are correct before securing the lever to the neck. "Correct" is judged both by the general heights provided in Step 1 and also adjusted so the string will clear under the stop and over the base (equally between stop and base) when it is plucked in an open (disengaged) position.

**Your action.** Place the lever under the string with the top hook of the stop over the string. Engage the sharpening lever so that the fret pin comes up directly under the marked lever point. An electronic tuner with a meter is very useful to determine the exact semi-tone position. Tune the string to its correct tone in open position, pluck the open note lightly, and read the note on the electronic tuner (Fig. 5). By engaging and disengaging the lever alternately (moving the handle up or down) and moving the lever slightly along the string when disengaged, determine the exact semi-tone point. (Fig. 6). Very small increments will make quite a difference. Read the meter a half tone higher for the sharpened string than the open string.

Fifth, drill holes and secure lever to neck.

**Information.** Always and frequently clean bits and taps and blow into drilled hole to clear out any wood chips. If the bit or the tap has wood pieces stuck to it, it will not cut properly and could cause the tap or bit to break. The tap especially is very thin and breaks easily.

**Theory.** A string will never get longer than it is at construction time, but might get shorter as the soundboard bellies upward. Taking great care to correctly place the lever on installation will help adjustments in the future. Drill the hole at the top portion of the slots rather than the bottom in order to make room for future adjustment.

**Your action.** Ensure the lever is straight (parallel with the string in both engaged and disengaged positions (Fig. 7). Do not install the lever in a crooked position. Use the awl to mark the hole starting position (Fig. 10) in the

upper part of the bottom left slot. Using a 5/64" bit, drill a hole at the top of the bottom left slot, and then use a #3-48 tap to put threads into the hole (Fig. 8). Blow wood dust out of the hole (Fig. 12) occasionally and make sure the tap is not "loaded" with wood pieces. Install the #3-48 x 1/2" button-head screw (Fig. 9) and tighten firmly. Move the lever handle to the disengaged position and put awl point mark in the upper part of the top right slot (Fig. 11), then use the tap to put threads into the hole as before. Blow dust away (Fig. 12) install screw (Figs. 13, 14). With the K base use both left slots (upper and lower).

**Sixth, comments on stops.**

Check closely to see that the string is mid-way between the base and the stop (Figs. 17, 18). Listen to the plucked string. If there is a small buzz, you can adjust the stop up or down in the slot or as a last resort, tap the top of the stop to bend it down *slightly* (use a small hammer), just enough to hold the string in the v-groove. *Disengage the lever when you tap!*

There are three sizes of stops to fit various string diameters. Stops are not necessary for most monofilament strings. Read information carefully before ordering, or, provide string specifications and I will help with your order.

**Seventh, install the next levers in the same manner.**



**Some Very Helpful Hints**

With all levers, you use only two slots to attach the lever. Do not use 4 screws.

Place screws in the upper part of the slots, using upper right and bottom left slots (K base use upper left).

Blow away chips and dust before inserting attachment screws.

Remember to reset the bridge pin to 1/2" from top of groove. You can move the bridge pin down by tapping it slightly with a hammer to hold the lever firmly in place while engaged. Lift it with a "cat's paw" (Fig. 1D).

Use yellow colored pencil to mark string # point on colored strings, black doesn't show up well.

Attach the lever to the harp neck by button-head Torx® screws using a hand-crank drill (Fig. 1B) and a straight Torx® driver. You can cut the Torx® L-wrench so you have a straight drill-like piece and place it in the hand-drill (Fig. 2).

If you insist on using an electric drill, be very careful not to strip out the wood.

Be sure to use the proper tool. Hex keys are not the same as a Torx® (star) wrench. The screw head can strip out and be useless if the wrong tool is used.

Mark the drill bit with masking tape to indicate the proper depth to stop drilling (Fig. 3).

Use a threaded tap (#3-48) to put threading in the hole. This will help guide the screw into the hole and will help prevent stripping the screw.

Adjust the stop, listen closely for any buzzes.

Sources for buzzes may be: (1) string hits base: string needs to be higher, raise bridge pin; (2) string hits stop -- string needs to be lower, tap bridge pin in slightly.

It is possible to adjust (tighten) screws so the levers work smoothly. All screws use the #6 Torx® wrench.

Use an awl point (Figs. 1A, 10) to indent where the drill will bite into the wood to make a hole.

The button-head Torx® screws will not interfere with the handle when engaging or disengaging the lever.

Tighten screws to a snug hand-tight torque. Over-tightening may result in the wood stripping or the star shaped head of screw may strip.

Use stops on levers installed for all wound strings. Some monofilament gut strings (over .060 diameter), and some long monofilament nylon strings (over 29" long) may need a stop on the lever.

**Parts information**

The stop is attached to the base by a #2-56x1/8" Torx® screw. It can be adjusted higher by loosening the screw and raising the stop slightly, then tighten the screw. There are three sizes of stops to accommodate narrow, medium, and thick strings.

The levers are cut out of brass material which has been 24-karat gold plated. In the plating process the brass is first nickel-plated then gold plating is applied. If normal wear over time removes the gold plating, the silver color of the nickel plating will be exposed. There should be no corrosion or discoloration occurring with these levers. To clean, use a soft cloth and warm soap and water. A drop of oil between the handle and the base, and a drop along the curve of the base where the fret pin moves, will facilitate smooth action. Use synthetic oil rather than petroleum products. Do not use WD-40 as it tends to pick up dust and become gummy.

There are different configurations for the #6 Torx® wrench. An L-shaped double-ended wrench \$1.75; a wing-handled wrench \$3.95; a longer, thicker handled wrench \$5.50; and a long, wood-handled, metal extended wrench for adjusting the stops \$9.50.

You can purchase extra hand taps (#3-48 plug) and bits (5/64") from any hardware store or from Dragonwhispers® for \$6.05 and \$2.00 respectively.

Extra stops: \$2.00; brass fret \$2.00; delrin fret \$0.50, extra screws \$0.10 each.

