



Installing and Embedding BetterComb into Wired Frames with the BetterComb Embedding Device

It is important that BetterComb is carefully and securely installed in frames. The comb must be secured so that it doesn't sag or move in the frames. For best results, we recommend embedding the foundation into prewired frames. It is also beneficial to "pin" the comb into the frames using toothpicks.

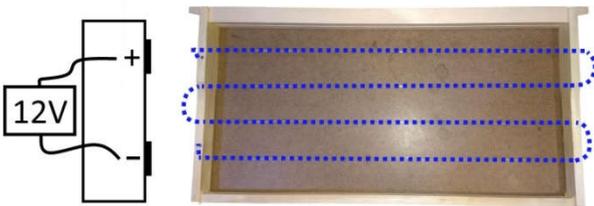
We have assembled a tool to make the embedding easier. Here are the steps we suggest you follow in embedding the combs into your frames. **Warning: using the embedder involves risk of burns and fire. Do not leave battery connected when not in use. Do not allow children to use the embedder. Use caution to avoid burns. When finished, disconnect battery and ensure all parts have cooled before handling.**

Required supplies:

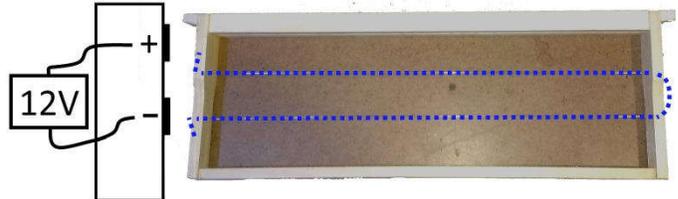
- BetterComb Embedding Device
- Fully wired frames
- BetterComb
- 12V battery (lawnmower or car battery) or other 12V power supply capable of 10+ amps
- C-clamp or spring clamp
- BetterComb embedding board (cardboard shim)

If you are wiring your own frames, follow the below guidelines. Use 27 gauge tinned steel wire for best results. Install eyelets into all sidebar holes, and then wire the frame. Anchor the wire on both ends using a small nail; it is important that the wire forms an "open circuit." Make sure the wire is tight. See wire routing below for deep and medium frames:

Deep Frame Wire Routing:



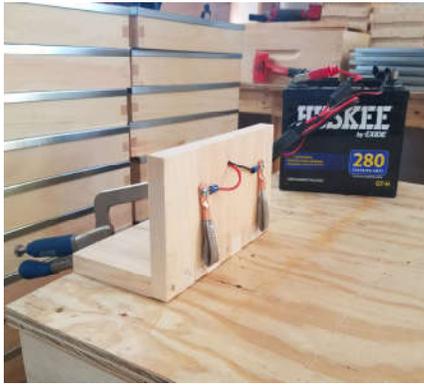
Medium or Shallow Frame Wire Routing



Secure the embedder to your table or workbench. You can use a clamp, or a couple screws or even double sided tape. The embedder needs to be secured because you will be pressing the frames against the embedder to make electrical contact between the device and the frame.

Note that there are 3 holes in the embedding tool. Use the widely spaced holes as shown for deep frames, and the two holes on the right end for medium frames.

When you are ready to begin embedding frames, connect the positive and negative clamps to a 12 volt battery. **Note: the terminals of the embedder are now energized with 12 volts. Be careful not to short circuit the terminals with any conductive tools. If a short circuit occurs, the protective fuse will cut power to the device.**



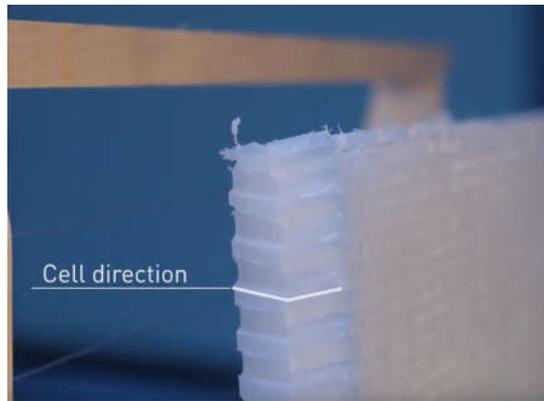
Clamp embedder to table.



Connect to battery, and place install board

Place the install board on the work surface next to the embedder.

Place the BetterComb on top of the install board. Note that the cells have slope and that the comb needs to be oriented so that cells slope as shown below (frame and comb shown in upright position).



Cell Orientation

Place the wired frame over the BetterComb, ensuring the top bar is on the “up” side of the comb. The ends of the wires need to face the embedder. Gently press the frame down over the foundation until the wires touch the comb. Occasionally the comb may be slightly too large and may need to be trimmed. The goal is to have the wires resting uniformly on the comb so that embedding will be uniform.



Set comb on board.



Set frame over comb.

Warning: The wires will get very hot when connected to the battery. Keep fingers away from exposed wires on the frame to avoid burns. Allow frame to cool several seconds before grasping by the ends.

Hold both ends of the frame and press frame against embedder contacts, being careful to keep fingers away from wires. The electrical contacts need to touch the two ends of the wires, near where the wire is nailed in place. Press down gently and wires will gradually sink into the comb until fully embedded. The goal is to embed the wires in the center core of the comb. Pull the frame away from the electrical contacts, and allow wires to cool for several seconds.



Press frame into embedder contacts.



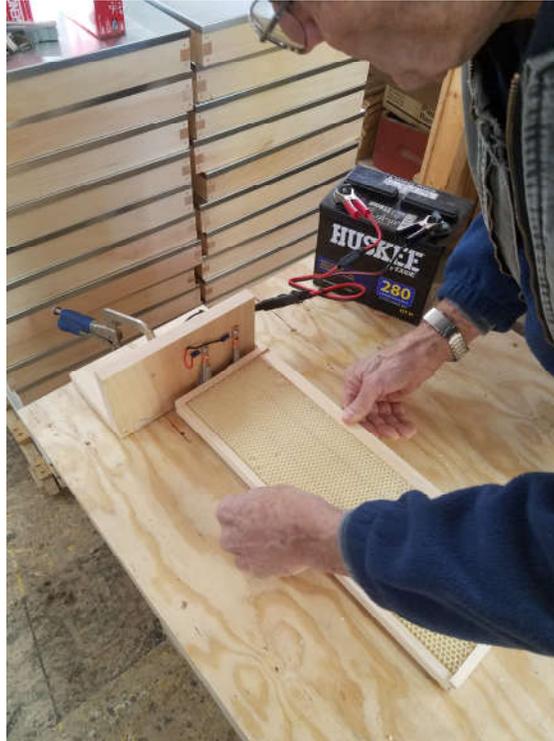
Press down on frame.



Let wires cool after embedding.



(Optional) Drill holes and install toothpicks in top and bottom bar to help hold comb in center of frame.



Medium Frames: move the left contact to center (narrow) position.
Always disconnect battery before changing contacts.

Frequently Asked Questions (FAQ):

- **The fuse blew while wiring frames. What now?**
 - The fuse is more likely to blow when embedding medium/shallow frames due to the shorter wire length, and also when using thick wire (thicker than 27 gauge). Increase fuse size to 15 amps if this is an issue. Fuses are available at auto parts or convenience stores.
- **What size battery do I need?**
 - A small garden tractor battery is sufficient. If desired, the battery can be charged while in use to keep the charge up. The same battery could be used to power a 12V oxalic acid vaporizer or an electric fence.
- **Should I crimp the wires before embedding?**
 - We don't recommend crimping the wires, as the crimped wire may damage the comb more than a straight wire. Instead, we recommend compressing the frame slightly during wiring and pulling the wire tight before nailing each end.
- **Can I use a battery charger as a power supply instead of a battery?**
 - Most modern chargers will not work as they have built-in short circuit protection. Older analog chargers may work.