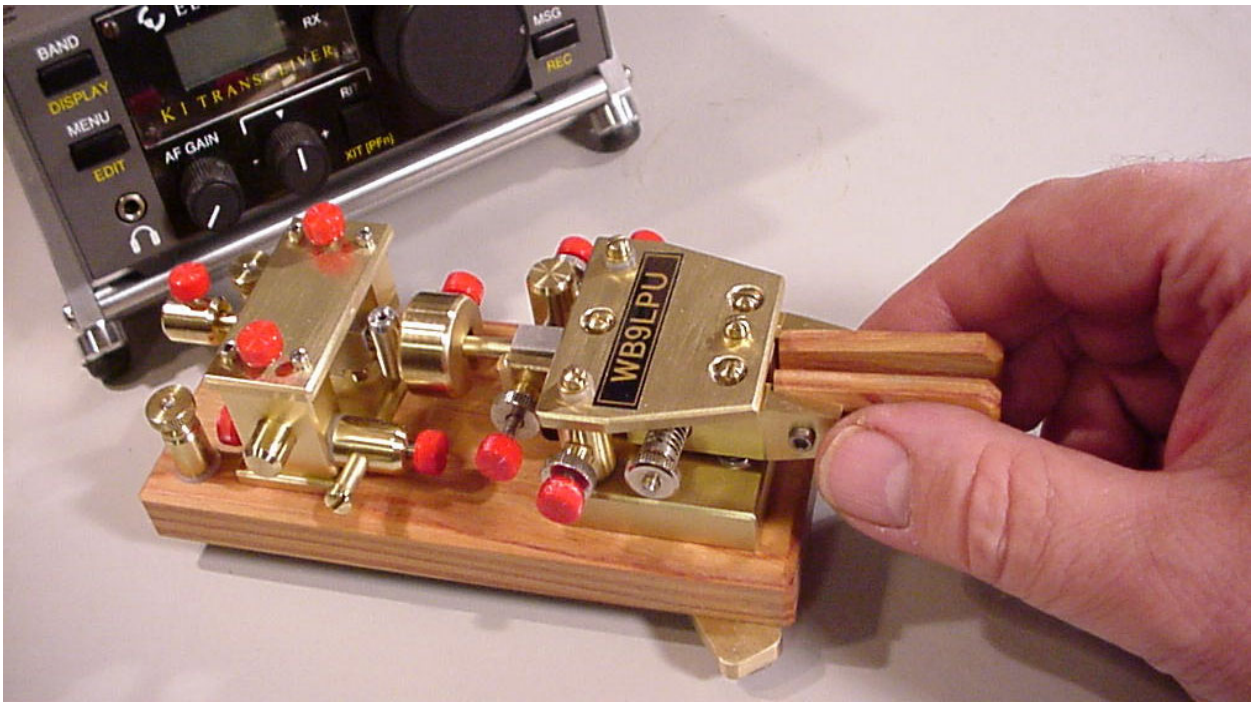
The Parkwood PaddleBug

A work in progress

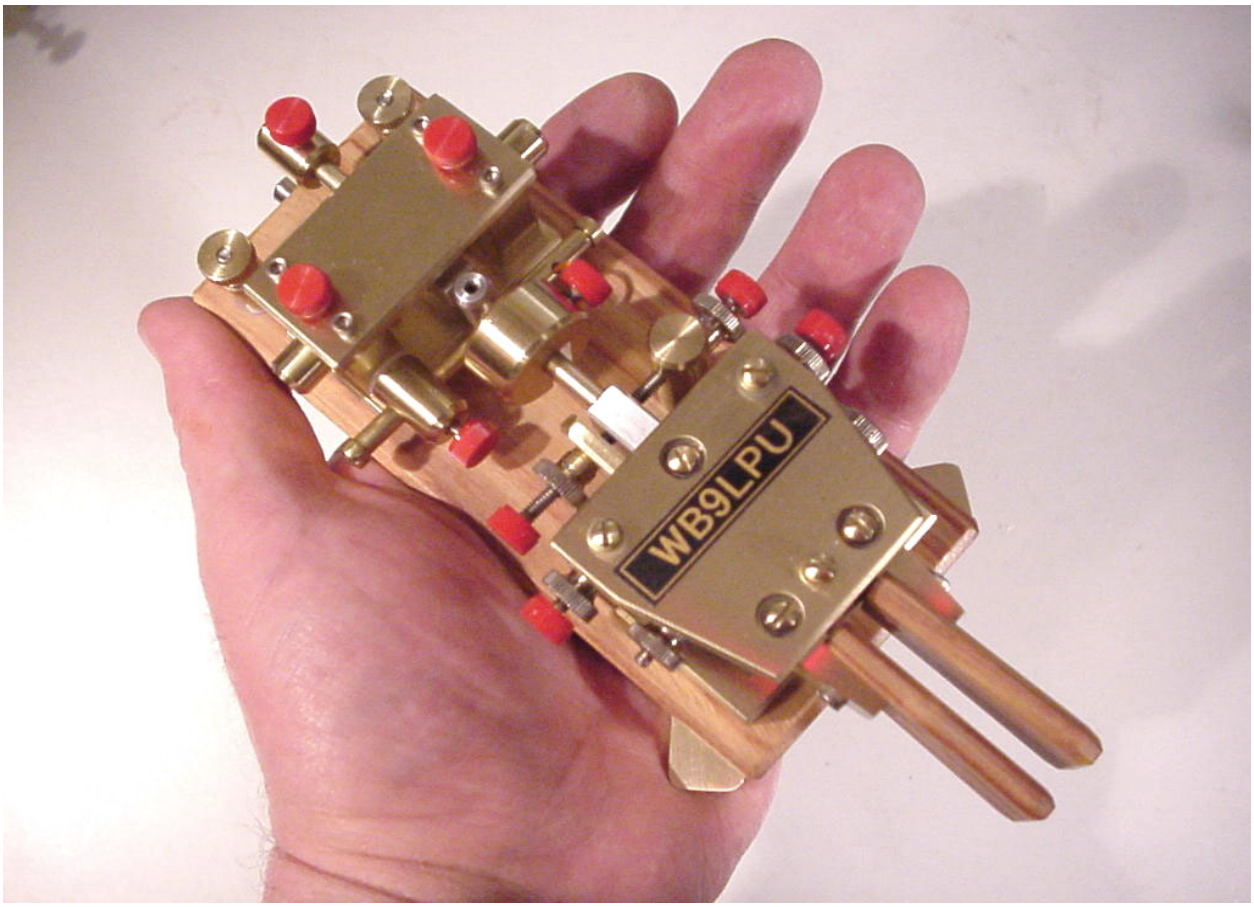
By Richard Meiss, WB9LPU



The Parkwood PaddleBug, shown here as prototype #1, is part of the ongoing design of keys, paddles, and bugs at WB9LPU. This device is another step in the investigation into the design and construction of magnetically-controlled bugs and it uses an approach not found in its predecessors.

Features –

- Combines the functionality of an *iambic paddle* and a *semi-automatic bug*
- Brass and aluminum construction, lacquered finish
- Base and fingerpieces of Brazilian tulipwood
- Small footprint – base dimensions 2.25 x 5.25 inches
- Weighs slightly over 1 pound
- Easy switchover between paddle and bug operation



As a paddle –

- Fully iambic, with individually adjustable contact spacing and tension
- Ball-bearing pivots
- Crisp action – stainless steel and brass contacts
- Has the major design features of the Parkwood Paddles

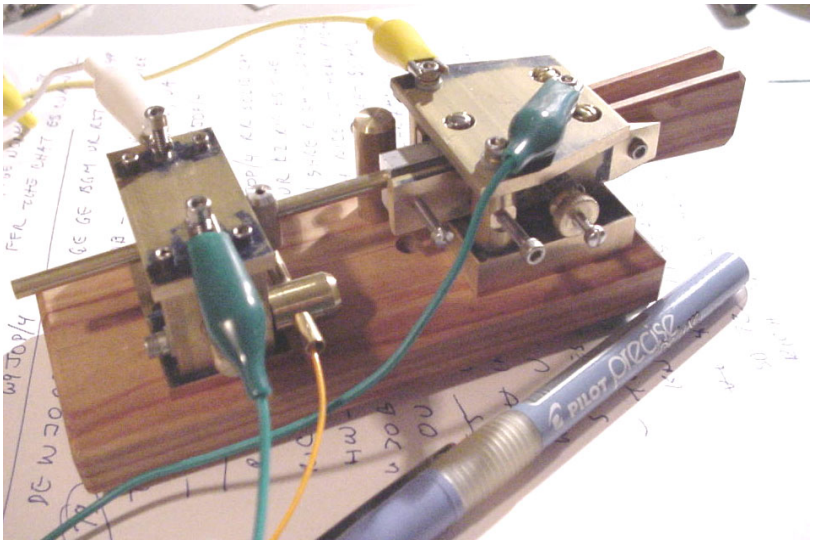
As a bug –

- Unique magnetically-operated pendulum with ball-bearing pivot
- Magnetic reed switch for “dit” contacts
- Rare-earth magnets used throughout
- Dual weights for speed adjustment
- Works well at speeds as low as 10 wpm
- Adjustable paddle tension, crisp action
- Quiet action, no mechanical damper needed

In previous Parkwood Bug designs, the pendulum oscillated between a fixed magnet and a moveable one attached to the “dit” paddle. Pressing the “dit” paddle swung the moveable magnet into position and it repelled the pendulum magnet, which then continued to oscillate as long as the magnets were in position. A magnetic reed switch closed each time another magnet passed over it. The energy input in this system was the pressing of the “dit” paddle; at rest, there was no stored energy.

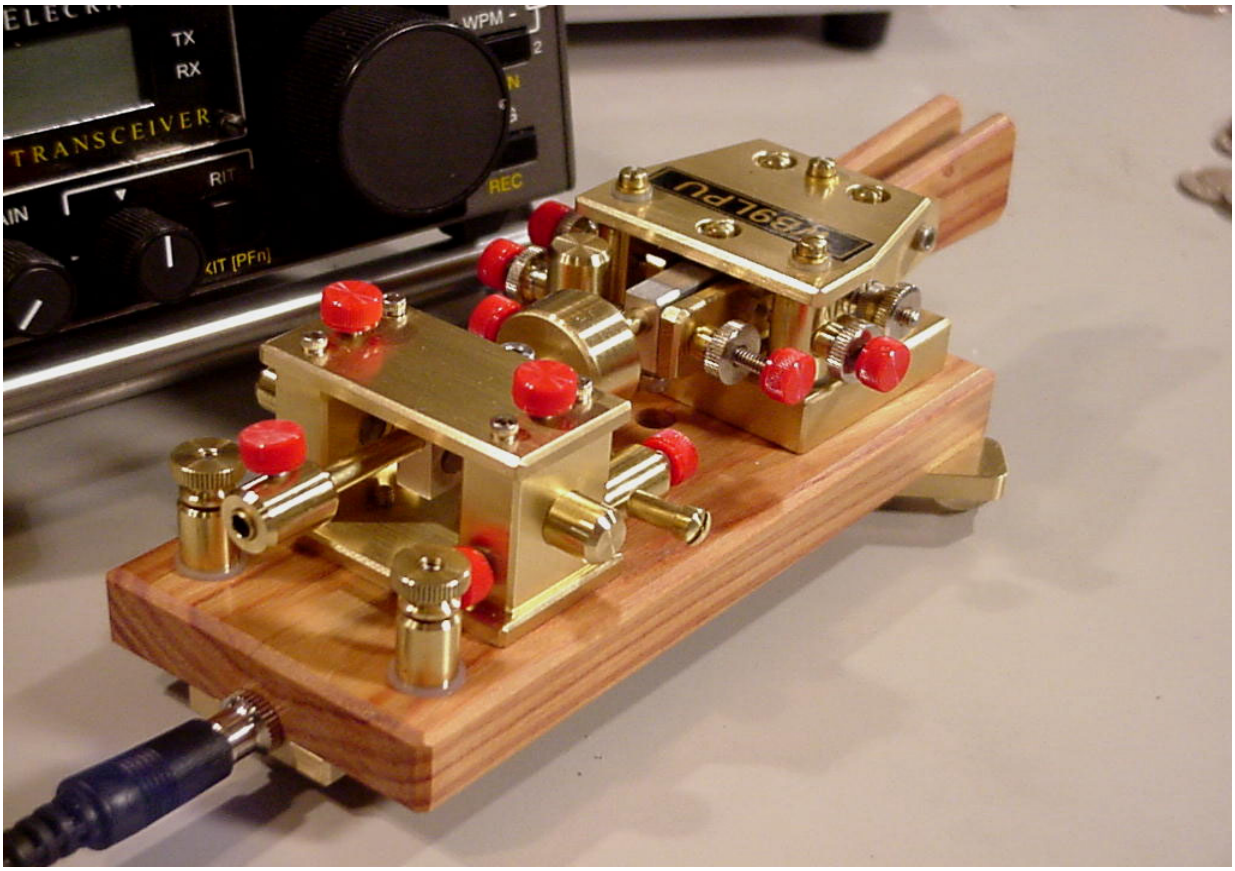
In the new design, when the “dit” paddle is at rest, it pushes the pendulum away from the equilibrium point between two fixed magnets. The “dit” paddle spring must be strong enough to maintain this displacement. When the paddle is pressed, it releases the pendulum, which begins to oscillate between the two fixed magnets. The energy is put into the system when the “dit” paddle is released, and it is stored in the “dit” paddle spring.

There are several advantages to the new system. It allows a very symmetrical design, which is simpler to construct. Because the pendulum is restrained when it is brought to rest, there is little tendency for it to bounce after movement, and there is no need for a damping mechanism. Finally, the design of the “dit” paddle arm is such that it can bear an electrical contact identical to that of the “dah” paddle. With proper connections, it can serve as an iambic paddle as well as a bug.

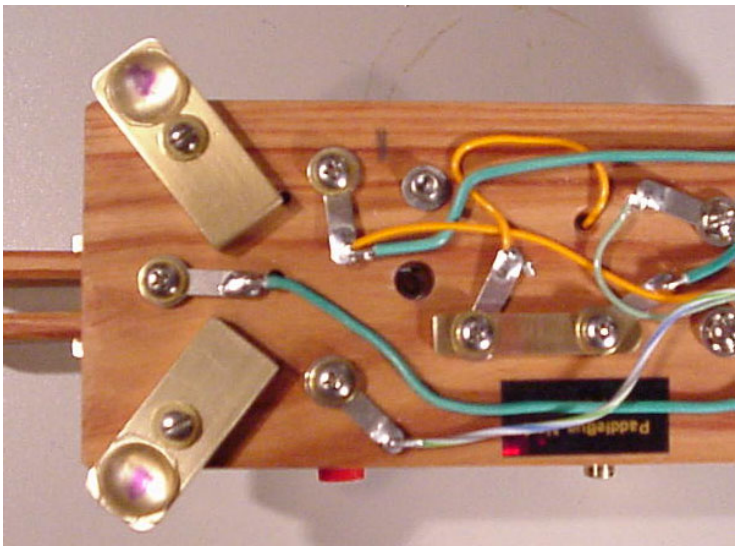


At an early stage of testing, the unit is connected up with alligator clip leads. Even at this early stage, it gave a good account of it on the air (thanks to the patience of the ham on the other end of my “new-bug fist.”)

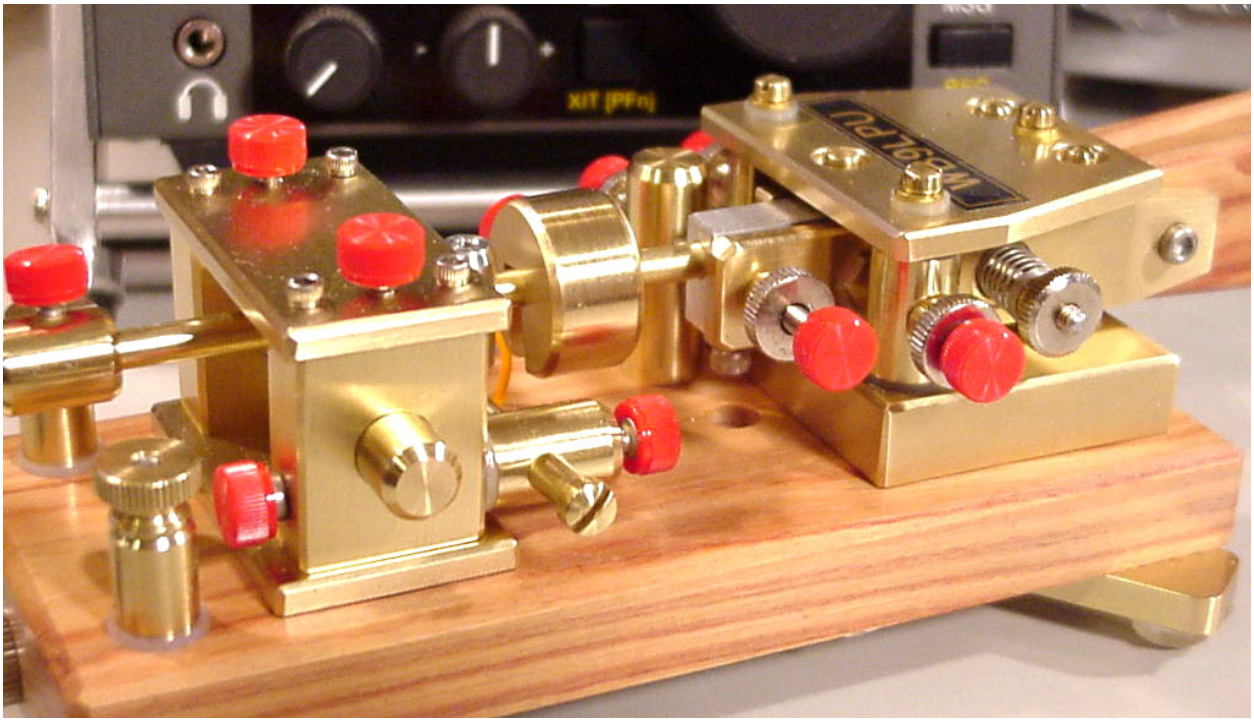
The following pages will show other views of the bug and some details of the construction.



The PaddleBug is a nice size for a small operating position (read “cluttered desktop” in my case). In this view, the two magnets that make the pendulum oscillate are seen protruding from the assembly with the two locking screws on top. The smaller pendulum weight extends between the binding posts.



The brass link seen near the middle of the bottom removes the reed switch from the circuit to disable the bug function and leave the paddle operation intact. The same result can be obtained by restraining the movement of the pendulum. In future versions there will be a mechanical stop for this function.



In this side view, the reed switch holder is at the lower center. The switch position can be changed to compensate for changes in the position of the pendulum, or to change the “weight” of the “dit” stream.

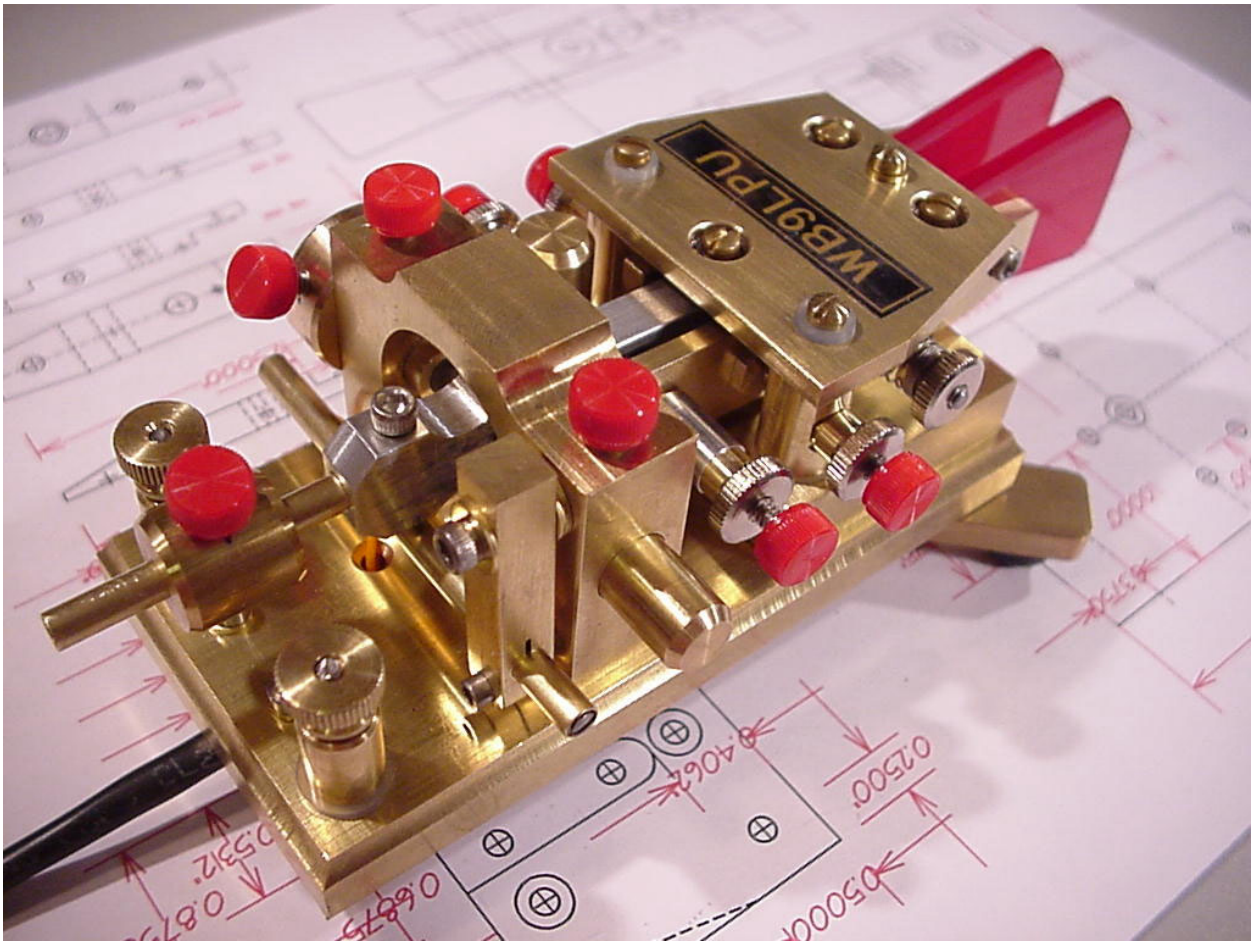
Slightly to the right of center are the two screws that adjust the rest position of the pendulum, and to their right are the adjustments for paddle travel and paddle tension. Some future models may use magnetic tension instead of coil springs for the paddle tension.

At the very center of the picture is the main pendulum weight. A smaller weight is mounted at the end of the pendulum (extreme left).

The PaddleBug is a work in progress. Shown next is an all-brass version that is considerably smaller (2” by 4” base), but it is heavier. Some changes have also been made to the pendulum and magnet assemblies. Even without these further refinements, the results with this first model have been very satisfying (even if they are 100 years too late).

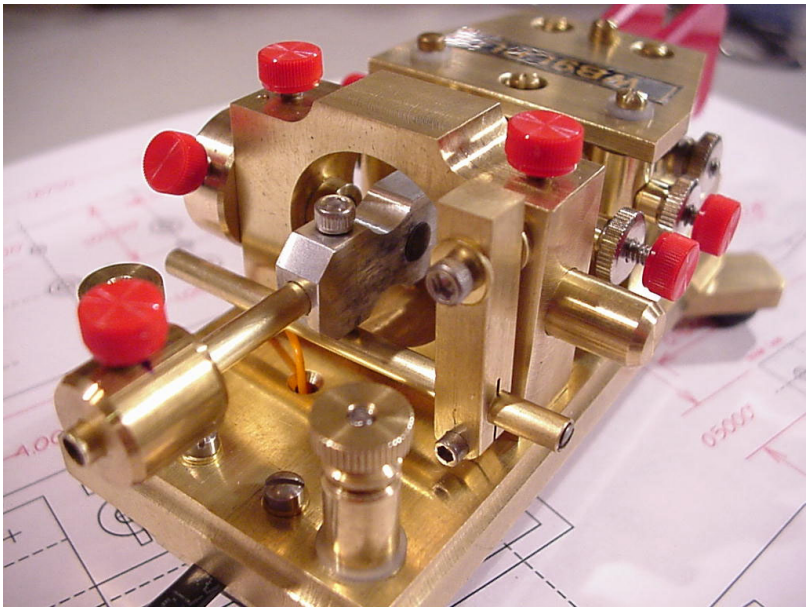
The second PaddleBug, is shown here is an unfinished state. All of the parts are cut to shape and assembled, but the final smoothing, polishing, and lacquering have not been done. For this reason, it will look a bit crude, but it is fully functional.

The second PaddleBug differs in several ways. As the view below shows, it is quite a bit shorter (by 1.25"), and it is mounted on a brass base.

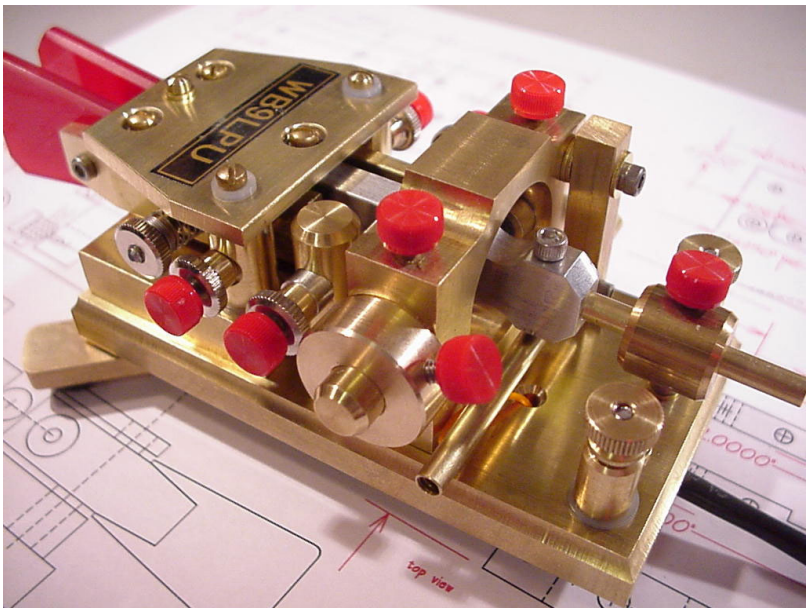


The pendulum pivot, pendulum stops, and magnet holders are made from a single piece of aluminum. This makes for a bit less machine work, but it means that the spacing between the paddle assembly and the fixed magnet holder is fixed. In order to get an acceptable speed range, the tip of the pendulum must protrude beyond the base. In this design, the residual mass of the pendulum (i.e., with no weights mounted) is somewhat higher and limits the top speed a bit. Depending on the fixed magnet settings, it can go to about 30 wpm, perhaps a little faster.

Another significant change is the method used to mount the reed switch pickup below the pendulum magnet. This is shown below:



The switch cylinder is mounted to the fixed magnet holder through a vertical bar with a rod-clamp arrangement at the bottom. While this approach allows a full range of adjustment in two planes, it is rather easily disturbed because the lock mechanism is too far away from the tip of the tube.



The circular object in the foreground is a "place-keeper" for the right magnet. Withdrawing this magnet causes a constant deflection of the pendulum to its rest position, and the unit then functions as a conventional paddle. The placekeeper allows the unit to be returned to its "bug" function without loss of its adjustments.

This second attempt works as well as the first and is a bit more stable due it its increased weight. The third PaddleBug will incorporate refinements in the pickup holder and pendulum mechanism.

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