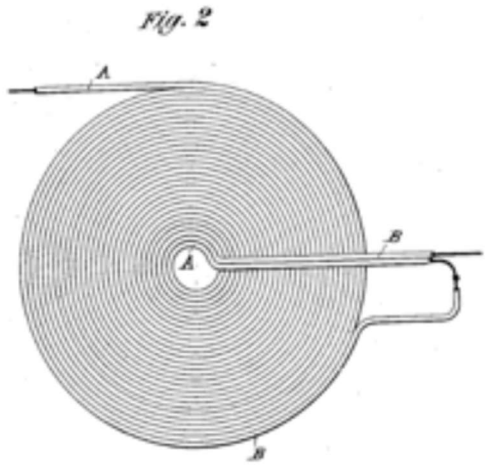
Tesla Bifilar Coil Patent — Question & Response

User question / comment:



In Tesla's bifilar coil patent (URL: https://patentimages.storage.googleapis.com/0b/3c/ab/eb51aebe935f8c/US512340.pdf - see attached image above from hist patent for the bifilar wound coil) Tesla says in the patent: "I have found that the accumulation of electric charge in a coil and the dangerous rise of potential are largely due to the self-induction of the coil, and that these may be prevented by a proper disposition of the conducting-wire. I therefore wind the coil in such way that the current passes in opposite directions through the two wires forming any two adjacent convolutions."

Assistant response:

Yep — that line in the patent is real, and it can sound like it contradicts the “series-aiding” description unless you picture which ends Tesla chose as terminals in that flat spiral.

In the flat spiral bifilar shown in his patent, the two wires are laid side-by-side along the same spiral path. Tesla’s goal was to keep adjacent turns close (large, distributed capacitance) and have adjacent turns sit at very different potentials (even larger effective capacitance), so the coil’s capacitance can neutralize its inductive reactance at a chosen frequency (self-resonance).

One way to do that in the pancake spiral is to tie the two inner ends together (a series junction at the center) and use the two outer ends as terminals A and B. Then the series current enters at A, spirals inward to the center through wire 1, crosses the center tie to wire 2, and spirals outward to B. Along the spiral, current in wire 1 is inward while in wire 2 it’s outward — opposite directions along adjacent side-by-side turns. That’s what Tesla meant by “two adjacent convolutions.” It’s a geometric/connection choice in the pancake layout, not a claim of a Lenz-law loophole.

Modern summaries emphasize the same core idea: adjacent turns belong to different wires and are at widely different potentials, giving high distributed capacitance and practical resonance. Whether the series junction is at the center or an end, the patent effect is about increasing capacitance and tuning L–C so reactances cancel at a frequency.

For a helical bifilar, you only get “adjacent turns carry opposite current” if you wire it series-opposing (like your A2→B2 case), which is the non-inductive style used to cancel inductance. Tesla’s patent style is about boosting distributed capacitance and shaping resonance/phase, not making a permanently zero-inductance pickup. Resonance can reduce reactive opposition and shift phase (sometimes lowering perceived drag), but average Lenz drag still tracks real power extraction.