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**PENG et al.**(10) **Pub. No.: US 2022/0360175 A1**(43) **Pub. Date: Nov. 10, 2022**(54) **POWER SUPPLY APPARATUS WITH  
STEP-UP AND STEP-DOWN CONVERSION**(71) Applicant: **CHICONY POWER TECHNOLOGY  
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(2021.05); **H02M 1/0048** (2021.05)(57) **ABSTRACT**

A power supply apparatus with step-up and step-down conversion includes a primary-side rectifying/filtering circuit, a step-up converter, a full-bridge LLC converter, a primary-side controller, a secondary-side rectifying/filtering circuit, a voltage regulator, and a secondary-side controller. The primary-side rectifying/filtering circuit rectifies and filters an AC input voltage into a DC input voltage. The primary-side controller controls the step-up converter to step up the DC input voltage to a step-up voltage, and controls the full-bridge LLC converter to convert the step-up voltage to a conversion voltage. The secondary-side rectifying/filtering circuit rectifies and filters the conversion voltage into a DC output voltage. The secondary-side controller controls the primary-side controller to provide the step-up control signal and the conversion control signal and provides a voltage regulation signal to control the voltage regulator so as to regulate the DC output voltage to an output voltage for supplying power to the load.

