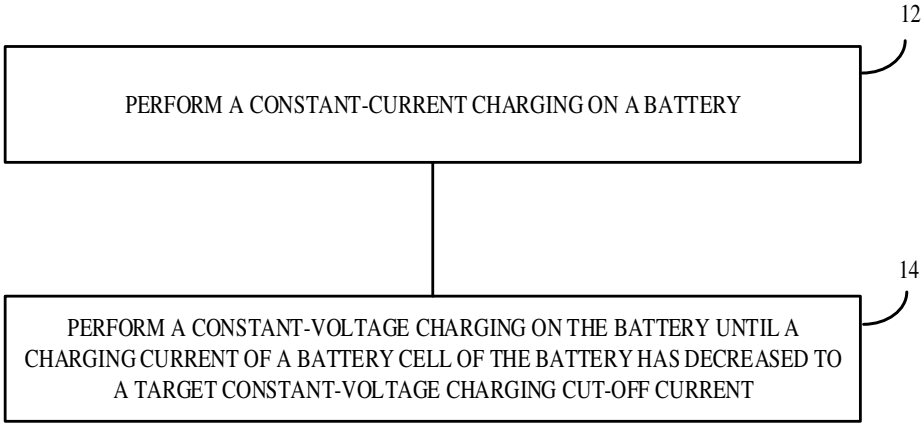

12
PERFORM A CONSTANT-CURRENT CHARGING ON A BATTERY
14
PERFORM A CONSTANT-VOLTAGE CHARGING ON THE BATTERY UNTIL A CHARGING CURRENT OF A BATTERY CELL OF THE BATTERY HAS DECREASED TO A TARGET CONSTANT-VOLTAGE CHARGING CUT-OFF CURRENT

FIG. 1

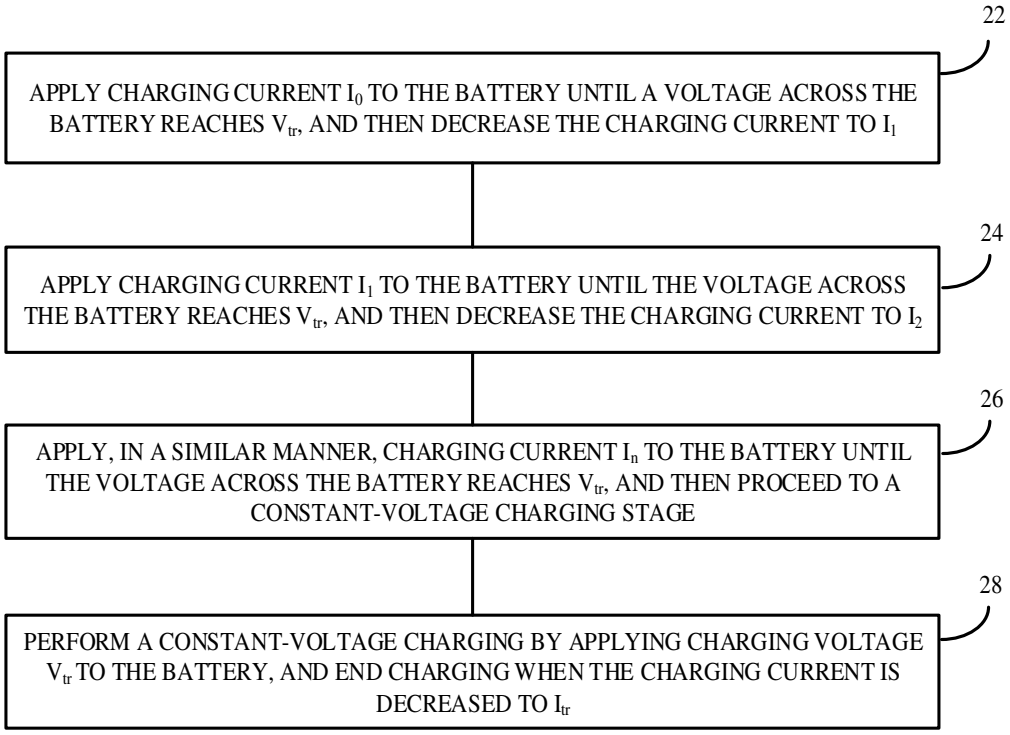

22
APPLY CHARGING CURRENT I_0 TO THE BATTERY UNTIL A VOLTAGE ACROSS THE BATTERY REACHES V_{tr}, AND THEN DECREASE THE CHARGING CURRENT TO I_1
24
APPLY CHARGING CURRENT I_1 TO THE BATTERY UNTIL THE VOLTAGE ACROSS THE BATTERY REACHES V_{tr}, AND THEN DECREASE THE CHARGING CURRENT TO I_2
26
APPLY, IN A SIMILAR MANNER, CHARGING CURRENT I_n TO THE BATTERY UNTIL THE VOLTAGE ACROSS THE BATTERY REACHES V_{tr}, AND THEN PROCEED TO A CONSTANT-VOLTAGE CHARGING STAGE
28
PERFORM A CONSTANT-VOLTAGE CHARGING BY APPLYING CHARGING VOLTAGE V_{tr} TO THE BATTERY, AND END CHARGING WHEN THE CHARGING CURRENT IS DECREASED TO I_{tr}

FIG. 2

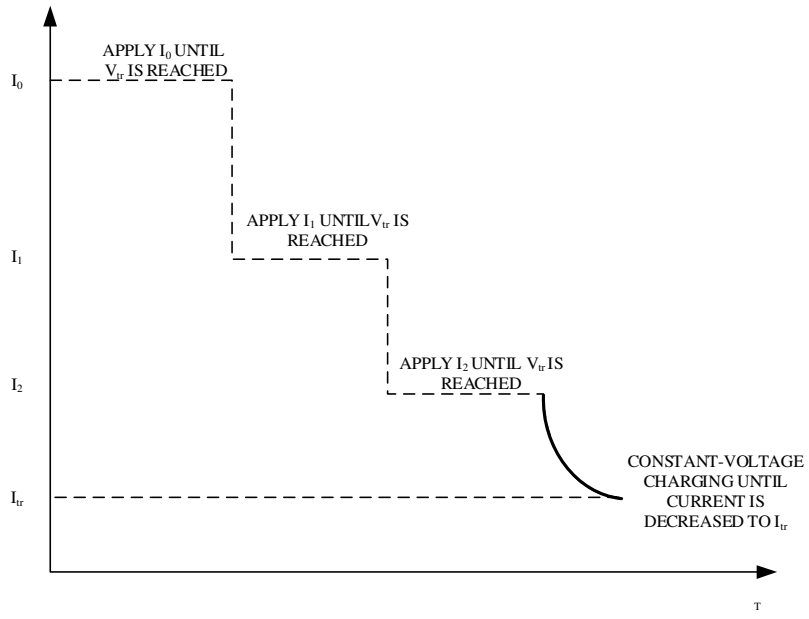

APPLY I_0 UNTIL V_{tr} IS REACHED
I_0
APPLY I_1 UNTIL V_{tr} IS REACHED
I_1
APPLY I_2 UNTIL V_{tr} IS REACHED
I_2
CONSTANT-VOLTAGE CHARGING UNTIL CURRENT IS DECREASED TO I_{tr}
I_{tr}
T

FIG. 3

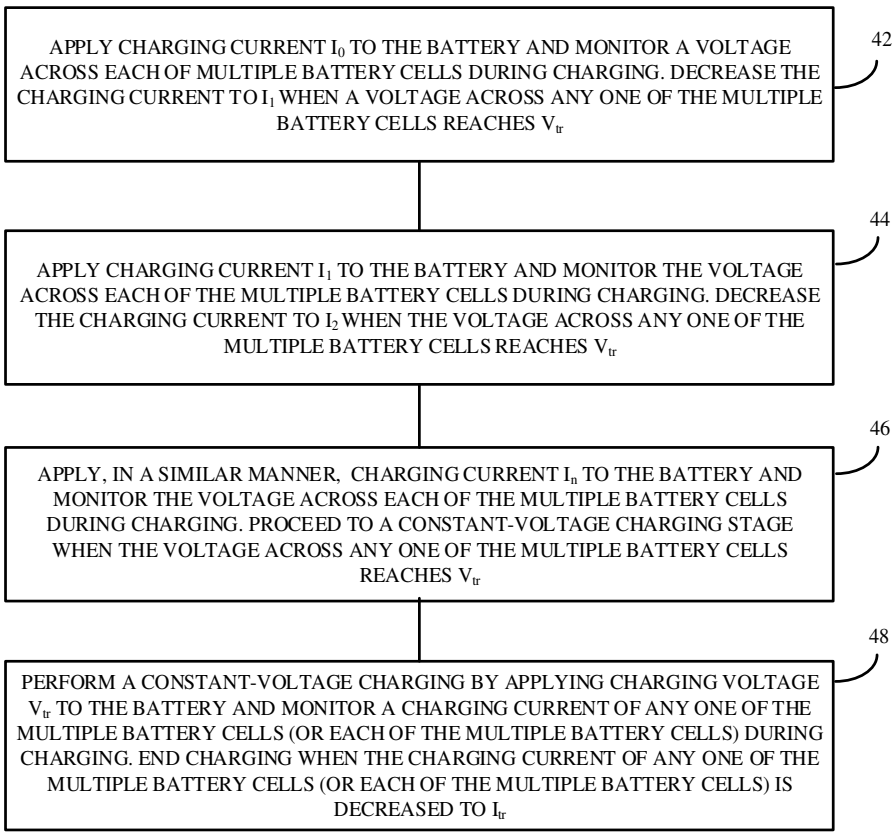

APPLY CHARGING CURRENT I_0 TO THE BATTERY AND MONITOR A VOLTAGE ACROSS EACH OF MULTIPLE BATTERY CELLS DURING CHARGING. DECREASE THE CHARGING CURRENT TO I_1 WHEN A VOLTAGE ACROSS ANY ONE OF THE MULTIPLE BATTERY CELLS REACHES V_{tr}
42
APPLY CHARGING CURRENT I_1 TO THE BATTERY AND MONITOR THE VOLTAGE ACROSS EACH OF THE MULTIPLE BATTERY CELLS DURING CHARGING. DECREASE THE CHARGING CURRENT TO I_2 WHEN THE VOLTAGE ACROSS ANY ONE OF THE MULTIPLE BATTERY CELLS REACHES V_{tr}
44
APPLY, IN A SIMILAR MANNER, CHARGING CURRENT I_n TO THE BATTERY AND MONITOR THE VOLTAGE ACROSS EACH OF THE MULTIPLE BATTERY CELLS DURING CHARGING. PROCEED TO A CONSTANT-VOLTAGE CHARGING STAGE WHEN THE VOLTAGE ACROSS ANY ONE OF THE MULTIPLE BATTERY CELLS REACHES V_{tr}
46
PERFORM A CONSTANT-VOLTAGE CHARGING BY APPLYING CHARGING VOLTAGE V_{tr} TO THE BATTERY AND MONITOR A CHARGING CURRENT OF ANY ONE OF THE MULTIPLE BATTERY CELLS (OR EACH OF THE MULTIPLE BATTERY CELLS) DURING CHARGING. END CHARGING WHEN THE CHARGING CURRENT OF ANY ONE OF THE MULTIPLE BATTERY CELLS (OR EACH OF THE MULTIPLE BATTERY CELLS) IS DECREASED TO I_{tr}
48

FIG. 4

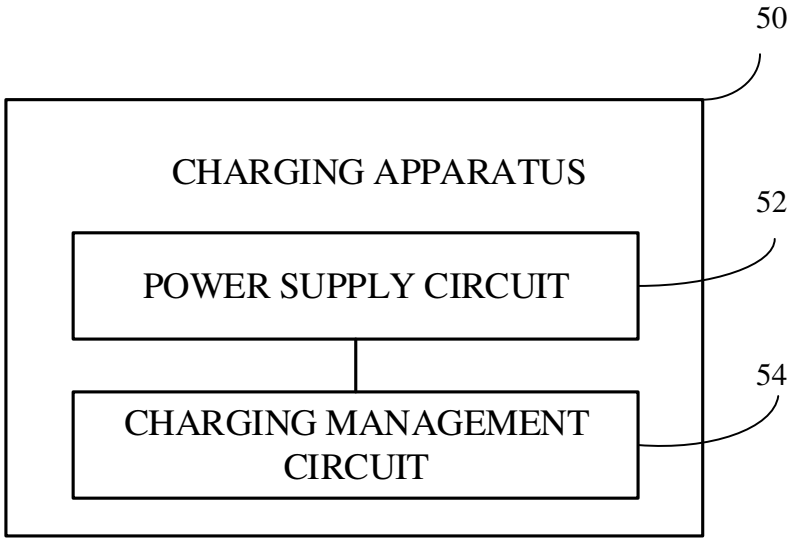

50
CHARGING APPARATUS
52
POWER SUPPLY CIRCUIT
54
CHARGING MANAGEMENT CIRCUIT

FIG. 5

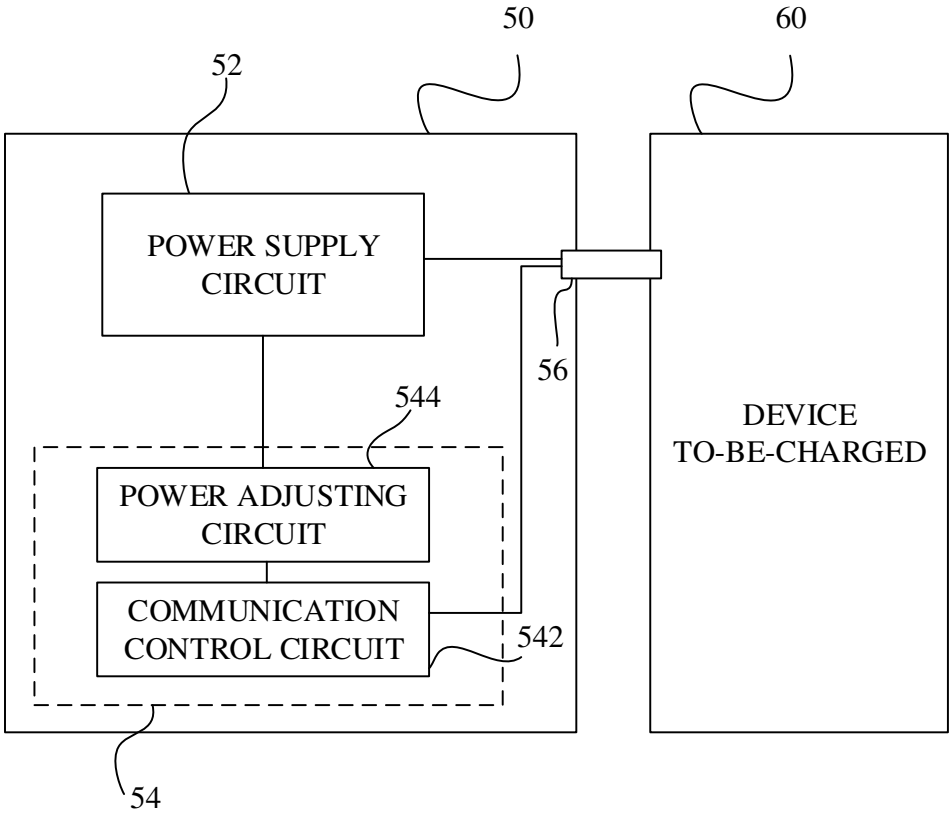

50
60
52
POWER SUPPLY CIRCUIT
56
544
DEVICE TO-BE-CHARGED
POWER ADJUSTING CIRCUIT
COMMUNICATION CONTROL CIRCUIT
542
54

FIG. 6

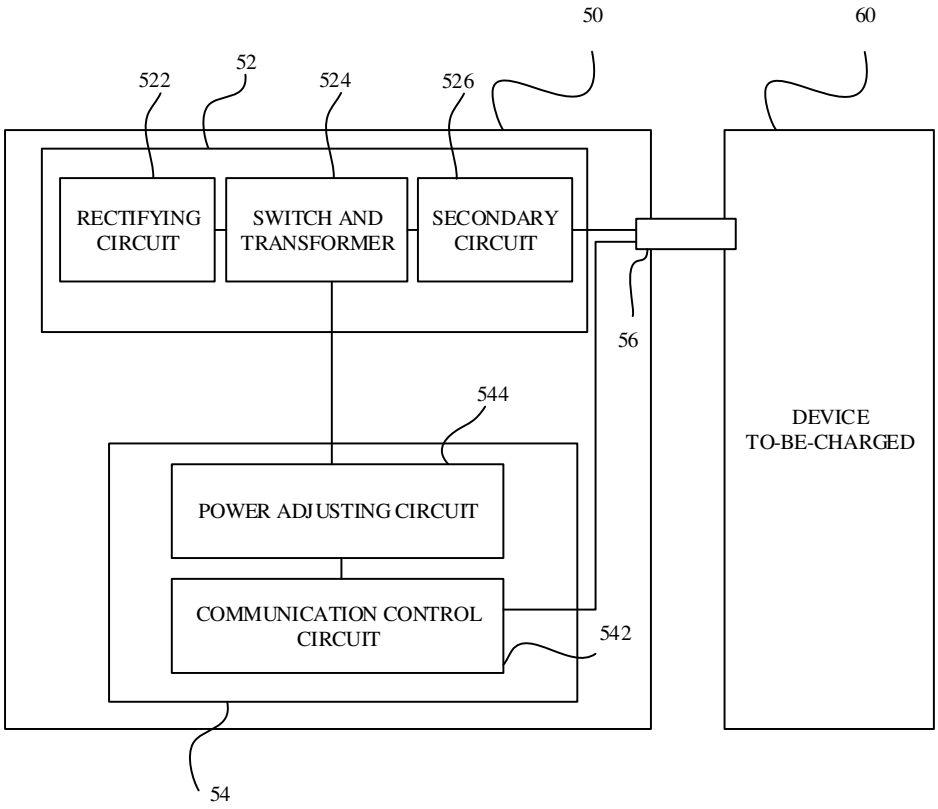

50
60
52
522
524
526
RECTIFYING CIRCUIT
SWITCH AND TRANSFORMER
SECONDARY CIRCUIT
56
544
DEVICE TO-BE-CHARGED
POWER ADJUSTING CIRCUIT
COMMUNICATION CONTROL CIRCUIT
542
54

FIG. 7

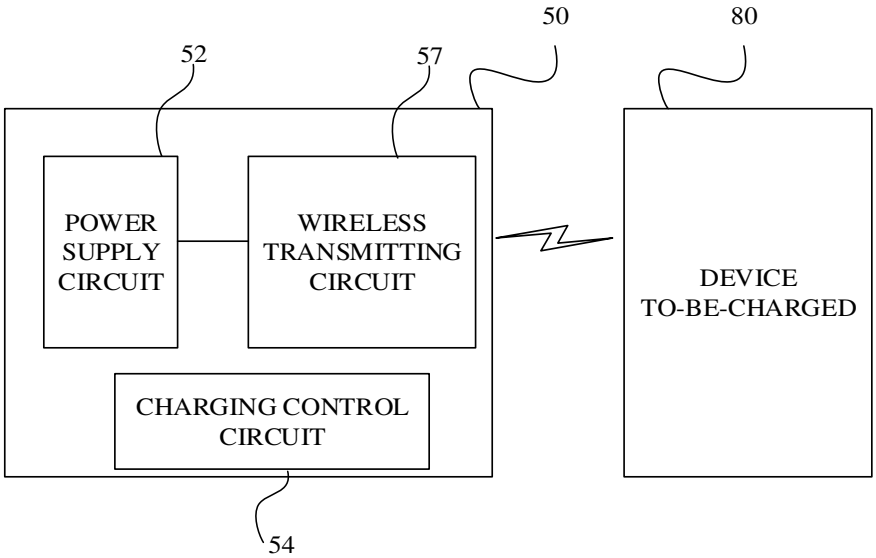

50
80
52
57
POWER SUPPLY CIRCUIT
WIRELESS TRANSMITTING CIRCUIT
DEVICE TO-BE-CHARGED
CHARGING CONTROL CIRCUIT
54

FIG. 8

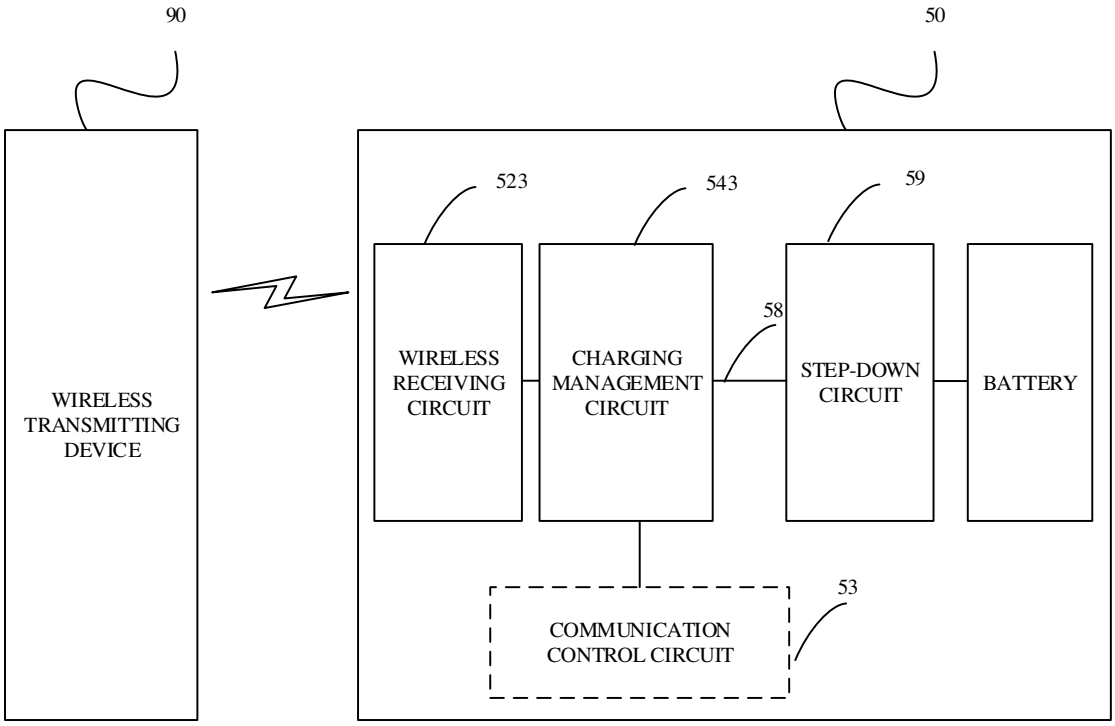

90
50
WIRELESS TRANSMITTING DEVICE
523
543
59
58
WIRELESS RECEIVING CIRCUIT
CHARGING MANAGEMENT CIRCUIT
STEP-DOWN CIRCUIT
BATTERY
53
COMMUNICATION CONTROL CIRCUIT

FIG. 9