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(71) Applicant *(for all designated States except US)*: **CANON KABUSHIKI KAISHA** [JP/JP]; 30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo, 1468501 (JP).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **IDE, Takeshi** [JP/JP]; C/O CANON KABUSHIKI KAISHA, 30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo, 1468501 (JP). **SEKIJIMA, Daishiro** [JP/JP]; C/O CANON KABUSHIKI KAISHA, 30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo, 1468501 (JP).

(74) Agents: **ABE, Takuma** et al.; C/O CANON KABUSHIKI KAISHA, 30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo, 1468501 (JP).

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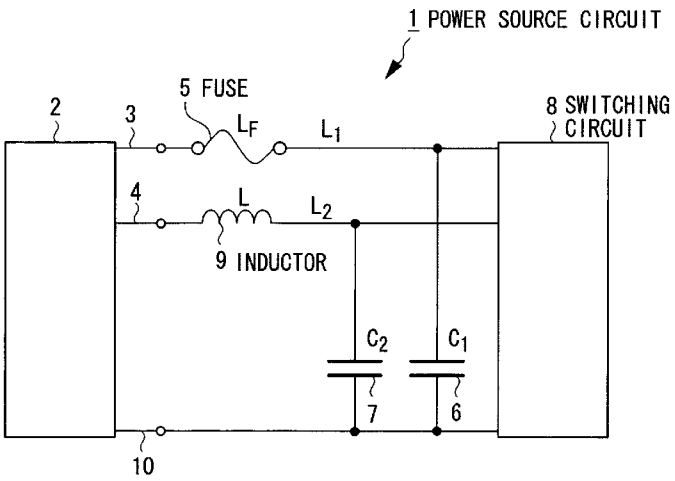
(54) Title: POWER SOURCE CIRCUIT

(57) Abstract: In a power source circuit including a switching circuit 8 as a power conversion circuit for converting by a switching operation at least one of a frequency and a voltage of an alternating voltage from an alternating power source 2 via a pair of supply lines 3 and 4, one supply line 3 includes a fuse 5 as an excess current protection element, and between a ground line 10 and one supply line 3, a first line bypass capacitor 6 is connected. Between the ground line 10 and another supply line 4, a second line bypass capacitor 7 is connected, and another supply line 4 includes an inductor 9. With this configuration, an unbalanced state of the circuit due to the excess current protection element is reduced so as to restrain the common mode noise.

FIG. 1A



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[1](Amended) A power source circuit comprising:

a power conversion circuit configured to convert by a switching operation at least one of a frequency and a voltage of an alternating voltage from an alternating power source via a pair of supply lines;

an excess current protection element provided for one supply line of the pair of supply lines;

a first line bypass capacitor connected between a ground line and the one supply line;

a second line bypass capacitor connected between the ground line and, of the pair of supply lines, another supply line; and

an inductor provided for the another supply line,

wherein, when a capacity value of the first line bypass capacitor is defined as C1[F], a capacity value of the second line bypass capacitor is defined as C2[F], an inductance value of the one supply line including an inductance component of the excess current protection element is defined as L1[H], an inductance value of the another supply line including an inductance component of the inductor is defined as L2[H], and an angular frequency of switching noise is defined as ω[rad/s], the inductance value of the inductor is set to satisfy a following expression.

$$\frac{2C_1 - C_2 - 2\omega^2 L_1 C_1 (C_1 + C_2)}{3C_2(1 - \omega^2 L_1 (C_1 + C_2))} L_1 < L_2 < \frac{2C_1 - C_2 - 2\omega^2 L_1 C_1 (C_1 + C_2)}{C_2(1 - \omega^2 L_1 (C_1 + C_2))} L_1$$

[2] The power source circuit according claim 1, wherein the inductance values of the inductors are set to satisfy a following expression.

$$\frac{C_1}{C_2} = \frac{L_2}{L_1}$$

[3] A power source circuit comprising:

a power conversion circuit configured to convert by a switching operation at least one of a frequency and a voltage of an alternating voltage from an alternating power source via a pair of supply lines;

an excess current protection element provided for one supply line of the pair of supply lines;

a first choke coil provided for the one supply line;

a second choke coil provided for another supply line of the pair of supply lines;

a first line bypass capacitor connected between a ground line and the one supply line; and

a second line bypass capacitor connected between the ground line and another supply line,

wherein, when an inductance value of the one supply line including an inductance component of the first choke coil and the excess current protection element is defined as L1[H], an inductance value of the another supply line including an inductance component of the second choke coil is defined as L2[H], a capacity value of the first line bypass capacitor is defined as C1[F], a capacity value of the second line bypass capacitor is defined as C2[F], the capacity values of the first line bypass capacitor and the second line bypass capacitor are set to satisfy a following expression.

$$\frac{2L_2}{L_1}-1<\frac{C_1}{C_2}<1$$

[4] The power source circuit according claim 3, wherein the inductance values of the inductors are set to satisfy a following expression.

$$\frac{C_1}{C_2}=\frac{L_2}{L_1}$$