CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H03 BASIC ELECTRONIC CIRCUITRY

H03B GENERATION OF OSCILLATIONS, DIRECTLY OR BY FREQUENCY-CHANGING, BY CIRCUITS EMPLOYING ACTIVE ELEMENTS WHICH OPERATE IN A NON-SWITCHING MANNER; GENERATION OF NOISE BY SUCH CIRCUITS (measuring, testing G01R; generators adapted for electrophonic musical instruments G10H; Speech synthesis G10L; masers, lasers H01S; dynamo-electric machines H02K; power inverter circuits H02M; by using pulse techniques H03K; automatic control of generators H03L; starting, synchronisation or stabilisation of generators where the type of generator is irrelevant or unspecified H03L; generation of oscillations in plasma H05H)

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 Details

1/02 . Structural details of power oscillators, e.g. for heating {(construction of transmitters H04B; features of generators for heating by electromagnetic fields H05B 6/00)}

1/04 . Reducing undesired oscillations, e.g. harmonics

5/00 Generation of oscillations using amplifier with regenerative feedback from output to input (H03B 9/00, H03B 15/00 take precedence)

5/02 . Details

5/04 . . Modifications of generator to compensate for variations in physical values, e.g. power supply, load, temperature

5/06 . . Modifications of generator to ensure starting of oscillations

5/08 . with frequency-determining element comprising lumped inductance and capacitance

5/10 . . active element in amplifier being vacuum tube (H03B 5/14 takes precedence)

5/12 . . active element in amplifier being semiconductor device (H03B 5/14 takes precedence)

5/1203 . . . {the amplifier being a single transistor}

5/1206 . . . {using multiple transistors for amplification}

5/1209 . . . . {the amplifier having two current paths operating in a differential manner and a current source or degeneration circuit in common to both paths, e.g. a long-tailed pair. (H03B 5/1215 takes precedence)}

5/1212 . . . . {the amplifier comprising a pair of transistors, wherein an output terminal of each being connected to an input terminal of the other, e.g. a cross coupled pair}

5/1215 . . . . . {the current source or degeneration circuit being in common to both transistors of the pair, e.g. a cross-coupled long-tailed pair}

5/1218 . . . . {the generator being of the balanced type}

5/1221 . . . . {the amplifier comprising multiple amplification stages connected in cascade}

5/1225 . . . . {the generator comprising multiple amplifiers connected in parallel}

5/1228 . . . {the amplifier comprising one or more field effect transistors}

5/1231 . . . {the amplifier comprising one or more bipolar transistors}

5/1234 . . . {and comprising means for varying the output amplitude of the generator (H03B 5/1278 takes precedence)}

5/1237 . . . {comprising means for varying the frequency of the generator}

5/124 . . . . {the means comprising a voltage dependent capacitance}

5/1243 . . . . . {the means comprising voltage variable capacitance diodes}

5/1246 . . . . . {the means comprising transistors used to provide a variable capacitance}

5/125 . . . . . {the transistors being bipolar transistors}

5/1253 . . . . . {the transistors being field-effect transistors}

5/1256 . . . . {the means comprising a variable inductance}

5/1259 . . . . . {the means comprising a variable active inductor, e.g. gyrator circuits}

5/1262 . . . . {the means comprising switched elements}

5/1265 . . . . . {switched capacitors}

5/1268 . . . . . {switched inductors}

5/1271 . . . . {the frequency being controlled by a control current, i.e. current controlled oscillators}

5/1275 . . . . {having further means for varying a parameter in dependence on the frequency}

5/1278 . . . . . {the parameter being an amplitude of a signal, e.g. maintaining a constant output amplitude over the frequency range}

5/1281 . . . . . {the parameter being the amount of feedback}

5/1284 . . . . . {the parameter being another frequency, e.g. a harmonic of the oscillating frequency}
5/1287 . . . . . {the parameter being a quality factor, e.g. Q factor of the frequency determining element}
5/129 . . . . . {the parameter being a bias voltage or a power supply}
5/1293 . . . . {having means for achieving a desired tuning characteristic, e.g. linearising the frequency characteristic across the tuning voltage range}
5/1296 . . . {the feedback circuit comprising a transformer}
5/14 . . frequency-determining element connected via bridge circuit to closed ring around which signal is transmitted
5/16 . . . active element in amplifier being vacuum tube
5/18 . with frequency-determining element comprising distributed inductance and capacitance
5/1805 . . {the frequency-determining element being a coaxial resonator}
5/1811 . . . {the active element in the amplifier being a vacuum tube (see provisionally also H03B 5/1835)}
5/1817 . . {the frequency-determining element being a cavity resonator}
5/1823 . . . {the active element in the amplifier being a semiconductor device}
5/1829 . . . . {the semiconductor device being a field-effect device}
5/1835 . . . {the active element in the amplifier being a vacuum tube}
5/1841 . . {the frequency-determining element being a strip line resonator (H03B 5/1805, H03B 5/1817, H03B 5/1864 and H03B 5/1882 take precedence)}
5/1847 . . . {the active element in the amplifier being a semiconductor device}
5/1852 . . . . {the semiconductor device being a field-effect device}
5/1858 . . . {the active element in the amplifier being a vacuum tube (see provisionally also H03B 5/1835)}
5/1864 . . {the frequency-determining element being a dielectric resonator}
5/187 . . . {the active element in the amplifier being a semiconductor device}
5/1876 . . . . {the semiconductor device being a field-effect device}
5/1882 . . {the frequency-determining element being a magnetic-field sensitive resonator, e.g. a Yttrium Iron Garnet or a magnetostatic surface wave resonator}
5/1888 . . . {the active element in the amplifier being a semiconductor device}
5/1894 . . . . {the semiconductor device being a field-effect device}
5/20 . with frequency-determining element comprising resistance and either capacitance or inductance, e.g. phase-shift oscillator
5/22 . . active element in amplifier being vacuum tube (H03B 5/26 takes precedence)
5/24 . . active element in amplifier being semiconductor device (H03B 5/26 takes precedence)
5/26 . . frequency-determining element being part of bridge circuit in closed ring around which signal is transmitted; frequency-determining element being connected via a bridge circuit to such a closed ring, e.g. Wien-Bridge oscillator, parallel-T oscillator
5/28 . . . active element in amplifier being vacuum tube
5/30 . with frequency-determining element being electromechanical resonator
5/32 . . being a piezo-electric resonator (selection of piezo-electric material H01L 41/00)
5/323 . . . {the resonator having more than two terminals (H03B 5/326 takes precedence)}
5/326 . . . {the resonator being an acoustic wave device, e.g. SAW or BAW device}
5/34 . . . active element in amplifier being vacuum tube (H03B 5/38 takes precedence)
5/36 . . . active element in amplifier being semiconductor device ({H03B 5/323, H03B 5/326} , H03B 5/38 take precedence)
5/362 . . . . {the amplifier being a single transistor (H03B 5/364 - H03B 5/368 take precedence)}
5/364 . . . . {the amplifier comprising field effect transistors (H03B 5/366 takes precedence)}
5/366 . . . . {and comprising means for varying the frequency by a variable voltage or current}
5/368 . . . . . {the means being voltage variable capacitance diodes}
5/38 . . . frequency-determining element being connected via bridge circuit to closed ring around which signal is transmitted
5/40 . . being a magnetostrictive resonator (H03B 5/42 takes precedence; selection of magneto-strictive material {H01F 1/00} ; H01L 41/00)
5/42 . . frequency-determining element connected via bridge circuit to closed ring around which signal is transmitted

7/00 Generation of oscillations using active element having a negative resistance between two of its electrodes (H03B 9/00 takes precedence)
7/02 . with frequency-determining element comprising lumped inductance and capacitance
7/04 . . active element being vacuum tube
7/06 . . active element being semiconductor device
7/08 . . . being a tunnel diode
7/10 . . active element being gas-discharge or arc-discharge tube
7/12 . with frequency-determining element comprising distributed inductance and capacitance
7/14 . . active element being semiconductor device
7/143 . . . {and which comprises an element depending on a voltage or a magnetic field, e.g. varactor-YIG}
7/146 . . . {with several semiconductor devices}

9/00 Generation of oscillations using transit-time effects **{**(construction of tube and circuit arrangements not adapted to a particular application H01J; construction of the semiconductor devices H01L)**}**
9/01 . using discharge tubes
9/02 . . using a retarding-field tube (using klystrons H03B 9/04)
9/04 . . using a klystron

9/06 . . . using a reflex klystron
9/08 . . using a travelling-wave tube
9/10 . . using a magnetron
9/12 . using solid state devices, e.g. Gunn-effect devices
2009/123 . . {using Gunn diodes}
2009/126 . . {using impact ionization avalanche transit time [IMPATT] diodes}
9/14 . . and elements comprising distributed inductance and capacitance
9/141 . . . {and comprising a voltage sensitive element, e.g. varactor}
9/142 . . . {and comprising a magnetic field sensitive element, e.g. YIG}
9/143 . . . {using more than one solid state device}
9/145 . . . {the frequency being determined by a cavity resonator, e.g. a hollow waveguide cavity or a coaxial cavity (H03B 9/141 - H03B 9/143, H03B 9/147, H03B 9/148 take precedence)}
9/146 . . . . {formed by a disc, e.g. a waveguide cap resonator}
9/147 . . . {the frequency being determined by a stripline resonator (H03B 9/141 - H03B 9/143, H03B 9/148 take precedence)}
9/148 . . . {the frequency being determined by a dielectric resonator (H03B 9/141 - H03B 9/143 take precedence)}

11/00 **Generation of oscillations using a shock-excited tuned circuit** (with feedback H03B 5/00)
11/02 . excited by spark (spark gaps therefor H01T 9/00)
11/04 . excited by interrupter
11/06 . . by mechanical interrupter
11/08 . . interrupter being discharge tube
11/10 . . interrupter being semiconductor device

13/00 **Generation of oscillations using deflection of electron beam in a cathode-ray tube**

15/00 **Generation of oscillations using galvano-magnetic devices, e.g. Hall-effect devices, or using superconductivity effects**
15/003 . {using superconductivity effects (devices using superconductivity H01L 39/00)}
15/006 . {using spin transfer effects or giant magnetoresistance}

17/00 **Generation of oscillations using radiation source and detector, e.g. with interposed variable obturator**

19/00 **Generation of oscillations by non-regenerative frequency multiplication or division of a signal from a separate source** (transference of modulation from one carrier to another H03D 7/00)
19/03 . using non-linear inductance
19/05 . using non-linear capacitance, e.g. varactor diodes
19/06 . by means of discharge device or semiconductor device with more than two electrodes
19/08 . . by means of a discharge device
19/10 . . . using multiplication only
19/12 . . . using division only
19/14 . . by means of a semiconductor device
19/16 . using uncontrolled rectifying devices, e.g. rectifying diodes or Schottky diodes
19/18 . . and elements comprising distributed inductance and capacitance
19/20 . . being diodes exhibiting charge storage or enhancement effects

21/00 **Generation of oscillations by combining unmodulated signals of different frequencies** (H03B 19/00 takes precedence; frequency changing circuits in general H03D)
21/01 . by beating unmodulated signals of different frequencies
21/02 . . by plural beating, i.e. for frequency synthesis {; Beating in combination with multiplication or division of frequency (digital frequency synthesis using a ROM G06F 1/02; digital frequency synthesis in general H03K; indirect frequency synthesis using a PLL H03L 7/16)}
21/025 . . . {by repeated mixing in combination with division of frequency only}
21/04 . . using several similar stages

23/00 **Generation of oscillations periodically swept over a predetermined frequency range** (angle-modulating circuits in general H03C 3/00)

25/00 **Simultaneous generation by a free-running oscillator of oscillations having different frequencies**

27/00 **Generation of oscillations providing a plurality of outputs of the same frequency but differing in phase, other than merely two anti-phase outputs**

28/00 **Generation of oscillations by methods not covered by groups H03B 5/00 - H03B 27/00, including modification of the waveform to produce sinusoidal oscillations** (analogue function generators for performing computing operations G06G 7/26; use of transformers for conversion of waveform in ac-ac converters H02M 5/18)

29/00 **Generation of noise currents and voltages** **{**(gasfilled discharge tubes with solid cathode specially adapted as noise generators H01J 17/005)**}**

2200/00 **Indexing scheme relating to details of oscillators covered by H03B**
2200/0002 . Types of oscillators
2200/0004 . . Butler oscillator
2200/0006 . . Clapp oscillator
2200/0008 . . Colpitts oscillator
2200/001 . . Hartley oscillator
2200/0012 . . Pierce oscillator
2200/0014 . Structural aspects of oscillators
2200/0016 . . including a ring, disk or loop shaped resonator
2200/0018 . . relating to the cutting angle of a crystal, e.g. AT cut quartz
2200/002 . . making use of ceramic material
2200/0022 . . characterised by the substrate, e.g. material
2200/0024 . . including parallel striplines
2200/0026 . . relating to the pins of integrated circuits
2200/0028 . . based on a monolithic microwave integrated circuit [MMIC]
2200/003 . Circuit elements of oscillators
2200/0032 . . including a device with a Schottky junction
2200/0034 . . including a buffer amplifier
2200/0036 . . including an emitter or source coupled transistor pair or a long tail pair
2200/0038 . . including a current mirror

2200/004 . . including a variable capacitance, e.g. a varicap, a varactor or a variable capacitance of a diode or transistor
2200/0042 . . . the capacitance diode being in the feedback path
2200/0044 . . including optical elements, e.g. optical injection locking
2200/0046 . . including measures to switch the gain of an amplifier
2200/0048 . . including measures to switch the frequency band, e.g. by harmonic selection
2200/005 . . including measures to switch a capacitor
2200/0052 . . including measures to switch the feedback circuit
2200/0054 . . including measures to switch a filter, e.g. for frequency tuning or for harmonic selection
2200/0056 . . including a diode used for switching
2200/0058 . . with particular transconductance characteristics, e.g. an operational transconductance amplifier
2200/006 . Functional aspects of oscillators
2200/0062 . . Bias and operating point
2200/0064 . . Pulse width, duty cycle or on/off ratio
2200/0066 . . Amplitude or AM detection
2200/0068 . . Frequency or FM detection
2200/007 . . Generation of oscillations based on harmonic frequencies, e.g. overtone oscillators
2200/0072 . . Frequency hopping and enabling of rapid frequency changes
2200/0074 . . Locking of an oscillator by injecting an input signal directly into the oscillator
2200/0076 . . Power combination of several oscillators oscillating at the same frequency
2200/0078 . . generating or using signals in quadrature
2200/008 . . making use of a reference frequency
2200/0082 . . Lowering the supply voltage and saving power
2200/0084 . . dedicated to Terahertz frequencies
2200/0086 . . relating to the Q factor or damping of the resonant circuit
2200/0088 . . Reduction of noise
2200/009 . . . Reduction of phase noise
2200/0092 . . Measures to linearise or reduce distortion of oscillator characteristics
2200/0094 . . Measures to ensure starting of oscillations
2200/0096 . . Measures to ensure stopping of oscillations
2200/0098 . . having a balanced output signal

2201/00 Aspects of oscillators relating to varying the frequency of the oscillations

2201/01 . Varying the frequency of the oscillations by manual means
2201/011 . . the means being an element with a variable capacitance
2201/012 . . the means being an element with a variable inductance
2201/014 . . the means being associated with an element comprising distributed inductances and capacitances
2201/015 . . . the element being a cavity
2201/017 . . . the element being a dielectric resonator
2201/018 . . the means being a manual switch
2201/02 . Varying the frequency of the oscillations by electronic means
2201/0208 . . the means being an element with a variable capacitance, e.g. capacitance diode
2201/0216 . . the means being an element with a variable inductance
2201/0225 . . the means being associated with an element comprising distributed inductances and capacitances
2201/0233 . . . the element being a cavity
2201/0241 . . . the element being a magnetically variable element, e.g. an Yttrium Iron Garnet
2201/025 . . the means being an electronic switch for switching in or out oscillator elements
2201/0258 . . . the means comprising a diode
2201/0266 . . . the means comprising a transistor
2201/0275 . . the means delivering several selected voltages or currents
2201/0283 . . . the means functioning digitally
2201/0291 . . . . and being controlled by a processing device, e.g. a microprocessor
2201/03 . Varying beside the frequency also another parameter of the oscillator in dependence on the frequency
2201/031 . . the parameter being the amplitude of a signal, e.g. maintaining a constant output amplitude over the frequency range
2201/033 . . the parameter being the amount of feedback
2201/035 . . the parameter being another frequency, e.g. a harmonic of the oscillating frequency
2201/036 . . the parameter being the quality factor of a resonator
2201/038 . . the parameter being a bias voltage or a power supply

2202/00 Aspects of oscillators relating to reduction of undesired oscillations

2202/01 . Reduction of undesired oscillations originated from distortion in one of the circuit elements of the oscillator
2202/012 . . the circuit element being the active device
2202/015 . . the circuit element being a limiter
2202/017 . . the circuit element being a frequency determining element
2202/02 . Reduction of undesired oscillations originated from natural noise of the circuit elements of the oscillator
2202/022 . . the noise being essentially white noise, i.e. frequency independent noise
2202/025 . . the noise being coloured noise, i.e. frequency dependent noise
2202/027 . . . the noise being essentially proportional to the inverse of the frequency, i.e. the so-called 1/f noise
2202/03 . Reduction of undesired oscillations originated from internal parasitic couplings, i.e. parasitic couplings within the oscillator itself
2202/04 . Reduction of undesired oscillations originated from outside noise or interferences, e.g. from parasitic couplings with circuit elements outside the oscillator
2202/042 . . the circuit element belonging to the power supply
2202/044 . . the circuit element belonging to transmitter circuitry
2202/046 . . the circuit element belonging to receiver circuitry
2202/048 . . the circuit element being a frequency divider
2202/05 . Reduction of undesired oscillations through filtering or through special resonator characteristics

2202/06 . Reduction of undesired oscillations through modification of a bias voltage, e.g. selecting the operation point of an active device

2202/07 . Reduction of undesired oscillations through a cancelling of the undesired oscillation

2202/073 . . by modifying the internal feedback of the oscillator

2202/076 . . by using a feedback loop external to the oscillator, e.g. the so-called noise degeneration

2202/08 . Reduction of undesired oscillations originated from the oscillator in circuit elements external to the oscillator by means associated with the oscillator

2202/082 . . by avoiding coupling between these circuit elements

2202/084 . . . through shielding

2202/086 . . . through a frequency dependent coupling, e.g. which attenuates a certain frequency range

2202/088 . . by compensating through additional couplings with these circuit elements