

CPC COOPERATIVE PATENT CLASSIFICATION

G10K SOUND-PRODUCING DEVICES (sound-producing toys [A63H 5/00](#); musical instruments or parts thereof, see the relevant subclass, e.g. [G10D](#)); **ACOUSTICS NOT OTHERWISE PROVIDED FOR** (systems using the reflection or reradiation of acoustic waves [G01S 15/00](#); generating seismic energy [G01V 1/02](#); signalling or calling arrangements, alarm arrangements [G08B](#); piezo-electric electrostrictive or magnetostrictive elements in general [H01L 41/00](#); transmission systems using infrasonic, sonic, or ultrasonic waves [H04B 11/00](#); loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers [H04R](#))

NOTES

1. This subclass covers arrangements for generating mechanical vibrations in fluids.
2. This subclass covers also the production of sounds which may not be audible to human beings but which are audible to animals.
3. In this subclass, the following terms are used with the meanings indicated:
 - "acoustics" and "sound" cover the technical field dealing with mechanical vibrations at all infrasonic -, sonic - and ultrasonic frequencies. However, generation or transmission of mechanical waves, in general, is covered by subclass [B06B](#), subject to the exception specified in Note (1) above.

1/00 Devices in which sound is produced by striking a resonating body, e.g. bell, chimes, gong (combinations with clocks or watches [G04B](#), [G04C](#); carillons [G10F 1/10](#); {for percussion instruments [G10D 13/00](#)})

1/06 . the resonating devices having the shape of a bell, plate, rod, or tube (bells for towers [G10K 1/28](#))

1/062 . . electrically operated {(self-interrupting relays [H01H 51/34](#))}

1/063 . . . the sounding member being a bell

1/064 Operating or striking mechanisms therefor

1/0645 {provided with loudness adjustment}

1/065 for timed or repeated operation {(alarm-clocks [G04C 21/00](#))}

1/066 . . . the sounding member being a tube, plate or rod

1/067 Operating or striking mechanisms therefor

1/068 . . hydraulically operated; pneumatically operated

1/07 . . mechanically operated; Hand bells; Bells for animals

1/071 . . . Hand bells; Bells for animals

1/072 . . . Operating or striking mechanisms therefor

1/074 with rotary clappers or shells

1/076 for timed or repeated operation {(alarm-clocks [G04B 23/00](#))}

1/08 . . Details or accessories of general applicability

1/10 . . . Sounding members; Mounting thereof; Clappers or other strikers

1/26 . . . Mountings; Casings

1/28 . Bells for towers or the like

1/30 . . Details or accessories

1/32 . . . Sounding members; Clappers or other strikers

1/34 . . . Operating mechanisms

1/341 {for a still-standing bell}

1/342 {electrically operated}

1/344 {for an oscillating bell which is driven once per cycle}

1/345 {electrically operated}

1/347 {for an oscillating bell which is driven twice per cycle}

1/348 {electrically operated}

1/36 . . . Means for silencing or damping (means or arrangements for avoiding or reducing out-of-balance forces due to motion [F16F 15/00](#))

1/38 . . . Supports; Mountings

3/00 Rattles or like noise-producing devices, {e.g. door-knockers}

5/00 Whistles

5/02 . Ultrasonic whistles

7/00 Sirens

7/005 . {Ultrasonic sirens}

7/02 . in which the sound-producing member is rotated manually or by a motor ([G10K 7/06](#) takes precedence; {musical tops [A63H 1/28](#)})

7/04 . . by an electric motor

7/06 . in which the sound-producing member is driven by a fluid, e.g. by a compressed gas {(fluidically operated vibrators [B06B 1/18](#))}

9/00 Devices in which sound is produced by vibrating a diaphragm or analogous element, e.g. fog horn, vehicle hooter, buzzer (loudspeakers or like acoustic electromechanical transducers [H04R](#) {arrangement or adaptation for ships [B63B 45/08](#); mechanically driven vibrators [B06B 1/10](#)})

9/02 . driven by gas; e.g. suction operated

9/04 . . by compressed gases, e.g. compressed air

9/06 . . produced by detonation

9/08 . driven by water or other liquids

9/10 . driven by mechanical means only

9/12 . electrically operated

NOTE

This group does not cover the construction of, or circuits for, broadband-transducers such as loudspeakers or microphones, which are covered by subclass [H04R](#).

9/121 . . {Flextensional transducers}

- 9/122 . . . using piezo-electric driving means {([G10K 9/121 takes precedence](#))}
- 9/125 . . . with a plurality of active elements
- 9/128 . . . using magnetostrictive driving means {([G10K 9/121 takes precedence](#))}
- 9/13 . . . using electromagnetic driving means
- NOTE**
- [see provisionally also G10K 9/12](#)
- 9/15 . . . Self-interrupting arrangements
- 9/16 . . . with means for generating current by muscle power
- 9/18 . Details, e.g. bulb, pump, piston, switch, casing {([cones, diaphragms G10K 13/00](#))}
- 9/20 . . . Sounding members
- 9/22 . . . Mountings; Casings
- 11/00 Methods or devices for transmitting, conducting or directing sound in general; Methods or devices for protecting against, or for damping, noise or other acoustic waves in general** ({[protective devices for the ears A61F 11/06](#)}; sound insulation for vehicles [B60R 13/08](#); sound insulation for aircraft [B64C 1/40](#); sound insulating materials, [see](#) the relevant places, e.g. [C04B 26/00](#) - [C04B 38/00](#); reduction of noise on permanent way [E01B 19/00](#); absorption of air-transmitted noise from road or railway traffic [E01F 8/00](#); noise insulation, absorption or reflection in buildings [E04B 1/74](#); room acoustics [E04B 1/99](#); sound insulation in floors [E04F 15/20](#); gas-flow silencers or exhaust apparatus for machines or engines in general, for internal-combustion engines [F01N](#); intake silencers for internal-combustion engines [F02M 35/00](#); suppression of undesired vibrations [F16F 7/00](#) - [G10K 15/00](#); preventing noise in valves [F16K 47/02](#); noise absorbers in pipes [F16L 55/02](#); arrangements for suppressing noise in direct-contact trickle coolers [F28C 1/10](#); silencers for weapons [F41](#))
- 11/002 . {[Devices for damping, suppressing, obstructing or conducting sound in acoustic devices](#) ([G10K 1/06](#) - [G10K 1/10](#) take precedence; for electro-mechanical transducers for communication [H04R 3/002](#))}
- 11/004 . {[Mounting transducers, e.g. provided with mechanical moving or orienting device](#) (mountings specially adapted to a particular sound-producing device, [see](#) the preceding groups [G10K 1/00](#) - [G10K 9/00](#), e.g. [G10K 1/26](#), [G10K 1/28](#), [G10K 9/22](#); arrangements of sonic watch equipment on submarines [B63G 8/39](#); buoys [B63B 22/00](#))}
- 11/006 . . {[Transducer mounting in underwater equipment, e.g. sonobuoys](#)}
- 11/008 . . . {[Arrays of transducers \(seismic streamers, \[see G01V 1/20\]\(#\)\)](#)}
- 11/02 . Mechanical acoustic impedances; Impedance matching, e.g. by horns; Acoustic resonators
- 11/025 . . {[horns for impedance matching](#) ([see provisionally also G10K 11/28](#))}
- 11/04 . . Acoustic filters {; [Acoustic resonators](#)}
- 11/08 . Non-electric sound-amplifying devices, e.g. non-electric megaphones ([amplifying by horns G10K 11/02](#); [amplifying by focusing G10K 11/26](#))
- 11/16 . Methods or devices for protecting against, or damping of, acoustic waves, e.g. sound ([G10K 11/36 takes precedence](#))
- NOTE**
- This group does not cover protecting against, or damping of, acoustic waves adapted for particular applications, which are covered by the subclasses for these applications, provided that there is a specific provision for this aspect.
- 11/161 . . {[in systems with fluid flow](#) ([G10K 11/162 takes precedence](#); gas flow silencers or exhaust apparatus for machines or engines in general or for internal combustion engine [F01N](#), noise absorbers in pipes or pipe systems [F16L 55/02](#); noise absorption in air conditioning and ventilation [F24F 13/24](#); silencing exhaust or propulsion jets in aircraft [B64D 33/06](#))}
- 11/162 . . Selection of materials
- 11/165 . . . Particles in a matrix
- 11/168 . . . Plural layers of different materials, e.g. sandwiches
- NOTE**
- When classifying in this group, classification is also made in subclass [B32B](#), in so far as any layered product is concerned.
- 11/172 . . . using resonance effects
- 11/175 . . using interference effects; Masking sound
- 11/178 . . . by electro-acoustically regenerating the original acoustic waves in anti-phase
- 11/1782 {[using single input](#)}
- 11/1784 {[using multiple inputs; single output](#)}
- 11/1786 {[using multiple inputs; multiple outputs](#)}
- 11/1788 {[Structural details](#)}
- 11/18 . Methods or devices for transmitting, conducting, or directing sound ([G10K 11/02](#), [G10K 11/36 take precedence](#); medical stethoscopes [A61B 7/02](#))
- 11/20 . . Reflecting arrangements ([G10K 11/28 takes precedence](#))
- 11/205 . . . {[for underwater use](#)}
- 11/22 . . for conducting sound through hollow pipes, e.g. speaking tubes
- 11/24 . . for conducting sound through solid bodies, e.g. wire
- 11/26 . . Sound-focusing or directing, e.g. scanning {([horns for impedance matching G10K 11/02](#); megaphones [G10K 11/08](#))}
- 11/28 . . . using reflection, e.g. parabolic reflector {([hearing aids A61F 11/008](#))}
- 11/30 . . . using refraction, e.g. acoustic lenses
- 11/32 . . . characterised by the shape of the source
- 11/34 . . . using electrical steering of transducer arrays, e.g. beam steering {([constructional aspects B06B 1/0607](#), [B06B 1/085](#))}
- 11/341 {[Circuits therefor](#)}
- 11/343 {[using frequency variation or different frequencies](#)}
- 11/345 {[using energy switching from one active element to another](#)}
- 11/346 {[using phase variation](#)}
- 11/348 {[using amplitude variation](#)}

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|----------------|---|------------|---|
| 11/35 | . . . using mechanical steering of transducers {or their beams} | 2210/1082 | . . . Microphones, e.g. systems using "virtual" microphones |
| 11/352 | {by moving the transducer} | 2210/109 | . . Compressors, e.g. fans |
| 11/355 | {Arcuate movement} | 2210/11 | . . Computers, i.e. ANC of the noise created by cooling fan, hard drive or the like |
| 11/357 | {by moving a reflector} | 2210/111 | . . Directivity control or beam pattern |
| 11/36 | . Devices for manipulating acoustic surface waves (electro-acoustic amplifiers H03F 13/00 ; networks comprising electro-acoustic elements H03H 9/00) | 2210/112 | . . Ducts (vehicle exhausts G10K 2210/12822) |
| 13/00 | Cones, diaphragms, or the like, for emitting or receiving sound in general (for electromechanical transducers H04R 7/00) | 2210/113 | . . Elevators |
| 15/00 | Acoustics not otherwise provided for | 2210/114 | . . Feeders, i.e. of the vibrating kind |
| 15/02 | . Synthesis of acoustic waves (synthesis of speech G10L) | 2210/115 | . . Impact noise, e.g. from typewriter or printer |
| | NOTE | 2210/116 | . . Medical; Dental |
| | see provisionally G10H e.g. G10H 1/26 | 2210/1161 | . . . NMR or MRI |
| 15/04 | . Sound-producing devices (G10K 15/02 takes precedence) | 2210/117 | . . Nonlinear |
| 15/043 | . . {producing shock waves (G10K 15/046 , G10K 15/06 take precedence; generating seismic energy G01V 1/02)} | 2210/118 | . . Panels, e.g. active sound-absorption panels or noise barriers |
| 15/046 | . . {using optical excitation, e.g. laser bundle} | 2210/119 | . . Radiation control, e.g. control of sound radiated by vibrating structures |
| 15/06 | . . using electric discharge | 2210/12 | . . Rooms, e.g. ANC inside a room, office, concert hall or automobile cabin |
| 15/08 | . Arrangements for producing a reverberation or echo sound {(modifying acoustic properties to change reverberation time G10K 11/002)} | 2210/121 | . . Rotating machines, e.g. engines, turbines, motors; Periodic or quasi-periodic signals in general |
| 15/10 | . . using time-delay networks comprising electromechanical or electro-acoustic devices | 2210/122 | . . Seismics |
| 15/12 | . . using electronic time-delay networks | 2210/123 | . . Synchrophasors or other applications where multiple noise sources are driven with a particular phase relationship |
| 2200/00 | {Details of methods or devices for transmitting, conducting or directing sound in general} | 2210/124 | . . Traffic |
| 2200/10 | . Beamforming, e.g. time reversal, phase conjugation or similar | 2210/125 | . . Transformers |
| 2200/11 | . Underwater, e.g. transducers for generating acoustic waves underwater | 2210/126 | . . Transients |
| 2210/00 | Details of active noise control [ANC] covered by G10K 11/178 but not provided for in any of its subgroups | 2210/127 | . . Underwater acoustics, e.g. for submarine |
| 2210/10 | . Applications | 2210/128 | . . Vehicles |
| 2210/101 | . . One dimensional | 2210/1281 | . . . Aircraft, e.g. spacecraft, airplane or helicopter |
| 2210/102 | . . Two dimensional | 2210/1282 | Automobiles |
| 2210/103 | . . Three dimensional | 2210/12821 | Rolling noise; Wind and body noise |
| 2210/104 | . . Aircos | 2210/12822 | Exhaust pipes or mufflers |
| 2210/105 | . . Appliances, e.g. washing machines or dishwashers | 2210/1283 | Trains, trams or the like |
| 2210/1051 | . . . Camcorder | 2210/129 | Vibration, e.g. instead of, or in addition to, acoustic noise |
| 2210/1052 | . . . Copiers or other image-forming apparatus, e.g. laser printer | 2210/1291 | Anti-Vibration-Control, e.g. reducing vibrations in panels or beams |
| 2210/1053 | . . . Hi-fi, i.e. anything involving music, radios or loudspeakers | 2210/30 | . Means |
| 2210/1054 | . . . Refrigerators | 2210/301 | . . Computational |
| 2210/106 | . . Boxes, i.e. active box covering a noise source; Enclosures | 2210/3011 | . . . Single acoustic input |
| 2210/107 | . . Combustion, e.g. burner noise control of jet engines (internal combustion engines G10K 2210/121) | 2210/3012 | . . . Algorithms |
| 2210/108 | . . Communication systems, e.g. where useful sound is kept and noise is cancelled | 2210/3013 | . . . Analogue, i.e. using analogue computers or circuits |
| 2210/1081 | . . . Earphones, e.g. for telephones, ear protectors or headsets | 2210/3014 | . . . Adaptive noise equalizers [ANE], i.e. where part of the unwanted sound is retained |
| | | 2210/3015 | . . . Averaging, e.g. exponential |
| | | 2210/3016 | . . . Control strategies, e.g. energy minimization or intensity measurements |
| | | 2210/3017 | . . . Copy, i.e. whereby an estimated transfer function in one functional block is copied to another block |
| | | 2210/3018 | . . . Correlators, e.g. convolvers or coherence calculators |
| | | 2210/3019 | . . . Cross-terms between multiple in's and out's |
| | | 2210/3021 | . . . Eigenfrequencies; Eigenvalues, e.g. used to identify most significant couplings between actuators and sensors |
| | | 2210/3022 | . . . Error paths |
| | | 2210/3023 | . . . Estimation of noise, e.g. on error signals |
| | | 2210/30231 | Sources, e.g. identifying noisy processes or components |

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| 2210/30232 | | Transfer functions, e.g. impulse response | 2210/3221 | . . . | Headrests, seats or the like, for personal ANC systems |
| 2210/3024 | . . . | Expert systems, e.g. artificial intelligence | 2210/3222 | . . . | Manual tuning |
| 2210/3025 | . . . | Determination of spectrum characteristics, e.g. FFT | 2210/3223 | . . . | Materials, e.g. special compositions or gases |
| 2210/3026 | . . . | Feedback | 2210/3224 | . . . | Passive absorbers |
| 2210/3027 | . . . | Feedforward | 2210/3225 | . . . | Radio or other sources used in ANC for transfer function estimation; Means to avoid interference between desired signals, e.g. from a car stereo, and the ANC signal |
| 2210/3028 | . . . | Filtering, e.g. Kalman filters or special analogue or digital filters | 2210/3226 | . . . | Sensor details, e.g. for producing a reference or error signal |
| 2210/30281 | | Lattice filters | 2210/3227 | . . . | Resonators |
| 2210/3029 | . . . | Fuzzy logic; Genetic algorithms | 2210/32271 | | Active resonators |
| 2210/3031 | . . . | Hardware, e.g. architecture | 2210/32272 | | Helmholtz resonators |
| 2210/3032 | . . . | Harmonics or sub-harmonics | 2210/3228 | . . . | Shunts |
| 2210/3033 | . . . | Information contained in memory, e.g. stored signals or transfer functions | 2210/3229 | . . . | Transducers |
| 2210/3034 | . . . | Integrators | 2210/32291 | | Plates or thin films, e.g. PVDF (foil-type piezo-electric elements B06B 1/0688) |
| 2210/3035 | . . . | Models, e.g. of the acoustic system | 2210/50 | . . . | Miscellaneous |
| 2210/30351 | | Identification of the environment for applying appropriate model characteristics | 2210/501 | . . | Acceleration, e.g. for accelerometers |
| 2210/3036 | . . . | Modes, e.g. vibrational or spatial modes | 2210/502 | . . | Ageing, e.g. of the control system |
| 2210/3037 | . . . | Monitoring various blocks in the flow chart | 2210/503 | . . | Diagnostics; Stability; Alarms; Failsafe |
| 2210/3038 | . . . | Neural networks | 2210/504 | . . | Calibration |
| 2210/3039 | . . . | Nonlinear, e.g. clipping, numerical truncation, thresholding or variable input and output gain | 2210/505 | . . | Echo cancellation, e.g. multipath-, ghost- or reverberation-cancellation |
| 2210/30391 | | Resetting of the filter parameters or changing the algorithm according to prevailing conditions | 2210/506 | . . | Feedback, e.g. howling |
| 2210/3041 | . . . | Offline | 2210/507 | . . | Flow or turbulence |
| 2210/3042 | . . . | Parallel processing | 2210/508 | . . | Reviews on ANC in general, e.g. literature |
| 2210/3043 | . . . | Phase locked loops [PLL] | 2210/509 | . . | Hybrid, i.e. combining different technologies, e.g. passive and active |
| 2210/3044 | . . . | Phase shift, e.g. complex envelope processing | 2210/51 | . . | Improving tonal quality, e.g. mimicking sports cars |
| 2210/3045 | . . . | Multiple acoustic inputs, single acoustic output | 2210/511 | . . | Narrow band, e.g. implementations for single frequency cancellation |
| 2210/3046 | . . . | Multiple acoustic inputs, multiple acoustic outputs | 2210/512 | . . | Wide band, e.g. non-recurring signals |
| 2210/3047 | . . . | Prediction, e.g. of future values of noise | | | |
| 2210/3048 | . . . | Pretraining, e.g. to identify transfer functions | | | |
| 2210/3049 | . . . | Random noise used, e.g. in model identification | | | |
| 2210/3051 | . . . | Sampling, e.g. variable rate, synchronous, decimated or interpolated | | | |
| 2210/3052 | . . . | Simulation | | | |
| 2210/3053 | . . . | Speeding up computation or convergence, or decreasing the computational load | | | |
| 2210/3054 | . . . | Stepsize variation | | | |
| 2210/3055 | . . . | Transfer function of the acoustic system | | | |
| 2210/3056 | . . . | Variable gain | | | |
| 2210/3057 | . . . | Variation of parameters to test for optimisation | | | |
| 2210/321 | . . | Physical | | | |
| 2210/3211 | . . . | Active mounts for vibrating structures with means to actively suppress the vibration, e.g. for vehicles | | | |
| 2210/3212 | . . . | Actuator details, e.g. composition or microstructure | | | |
| 2210/32121 | | Fluid amplifiers, e.g. modulated gas flow speaker using electrovalves | | | |
| 2210/3213 | . . . | Automatic gain control [AGC] | | | |
| 2210/3214 | . . . | Architectures, e.g. special constructional features or arrangements of features | | | |
| 2210/3215 | . . . | Arrays, e.g. for beamforming | | | |
| 2210/3216 | . . . | Cancellation means disposed in the vicinity of the source | | | |
| 2210/3217 | . . . | Collocated sensor and cancelling actuator, e.g. "virtual earth" designs | | | |
| 2210/3218 | . . . | Filters other than the algorithm-related filters | | | |
| 2210/3219 | . . . | Geometry of the configuration | | | |