

# 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](#)}

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 <a href="#">H03F 13/00</a> ; networks comprising electro-acoustic elements <a href="#">H03H 9/00</a> )	2210/112	. . Ducts ( <a href="#">vehicle exhausts G10K 2210/12822</a> )
<b>13/00</b>	<b>Cones, diaphragms, or the like, for emitting or receiving sound in general</b> (for electromechanical transducers <a href="#">H04R 7/00</a> )	2210/113	. . Elevators
<b>15/00</b>	<b>Acoustics not otherwise provided for</b>	2210/114	. . Feeders, i.e. of the vibrating kind
15/02	. Synthesis of acoustic waves ( <a href="#">synthesis of speech G10L</a> )	2210/115	. . Impact noise, e.g. from typewriter or printer
	<b>NOTE</b>	2210/116	. . Medical; Dental
	<a href="#">see provisionally G10H</a> e.g. <a href="#">G10H 1/26</a>	2210/1161	. . . NMR or MRI
15/04	. Sound-producing devices ( <a href="#">G10K 15/02</a> takes precedence)	2210/117	. . Nonlinear
15/043	. . {producing shock waves ( <a href="#">G10K 15/046</a> , <a href="#">G10K 15/06</a> take precedence; generating seismic energy <a href="#">G01V 1/02</a> )}	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 <a href="#">G10K 11/002</a> )}	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
<b>2200/00</b>	<b>{Details of methods or devices for transmitting, conducting or directing sound in general}</b>	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
<b>2210/00</b>	<b>Details of active noise control [ANC] covered by <a href="#">G10K 11/178</a> but not provided for in any of its subgroups</b>	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 ( <a href="#">internal combustion engines G10K 2210/121</a> )	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

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 ( <a href="#">foil-type piezo-electric elements B06B 1/0688</a> )
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			