

## **CLASS 381, ELECTRICAL AUDIO SIGNAL PROCESSING SYSTEMS AND DEVICES**

### **SECTION I - CLASS DEFINITION**

This class provides for: (a) wired one-way electrical transmission or processing systems for audio signals, (b) Stereophonic systems, which are not elsewhere classified, (c) instrument or process for converting an electrical audio information signal to or from humanly audible form.

- (1) Note. A "system" is an assemblage of two or more elements having diverse functions.
- (2) Note. An "audio" signal is an electrical signal which represents spoken or other sounds which vary with time, and may be in analog or digital form.
- (3) Note. Combinations of a loudspeaker or microphone with another audio signal processing device (e.g., amplifier, filter, etc.) or other circuit (e.g., bias circuit) are classified herein even if the loudspeaker or microphone is included by name only.
- (4) Note. Nominal recitation of "audio" is not sufficient to afford classification herein of an invention which would be otherwise classified elsewhere.

### **SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**

A transducer for conversion of speech or similar sound (e.g., music) to or from a corresponding electrical signal, and the combination of such a transducer with acoustical structure is classified herein (see Subclass References to the Current Class, below). Note that transducer structure combined with circuitry, other than a lead or connector, is classified with the system, either in this class (381), or in an external class for processing an audio signal.

Excluded from this class are two-way wired electrical audio signal transmission systems which are classified elsewhere. Transmissions of pulse signals which do not represent audio signals is classified elsewhere. Multiplex Communication Systems (except stereophonic multiplex systems) are classified elsewhere. Modulated Carrier Wave Communication Systems and devices are classified elsewhere. Combinations of subject matter of

this class with structure of a more comprehensive combination (e.g., Television Set) are classified with the combination. (See References to Other Classes, below.)

### **SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS**

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 150+, for a transducer for conversion of speech or similar sound (e.g., music) to or from a corresponding electrical signal, and the combination of such a transducer with acoustical structure.

### **SECTION IV - REFERENCES TO OTHER CLASSES**

SEE OR SEARCH CLASS:

- 27, Undertaking, subclass 31 for systems adapted for communication with entombed persons.
- 73, Measuring and Testing, subclasses 584+ for measuring sound waves, especially subclass 585 for audiometers (ear or hearing testing), and subclasses 646+ for measuring sound intensity.
- 84, Music, subclasses 600+ for electronic musical instruments.
- 178, Telegraphy, for transmissions of pulse signals which do not represent audio signals. (Lines With Other Classes and Within This Class).
- 181, Acoustics, appropriate subclasses for mechanical audio systems.
- 330, Amplifiers, for amplifiers not having specific input signals or specific loads.
- 340, Communications: Electrical, appropriate subclasses for electrical communications in general.
- 367, Communications, Electrical: Acoustic Wave Systems and Devices, subclass 132 for underwater speech transmission by an acoustic wave; subclasses 140+ for an acoustic transducer not related to speech signal conversion.
- 369, Dynamic Information Storage or Retrieval, appropriate subclasses for storing and retrieving sound signals.
- 370, Multiplex Communications, appropriate subclasses for multiplex communications and for multiplex communication systems (except stereophonic multiplex systems). (Lines With Other Classes and Within This Class).
- 375, Pulse or Digital Communications, for transmissions of pulse signals which do not repre-

- sent audio signals. (Lines With Other Classes and Within This Class).
- 379, Telephonic Communications, for two-way wired electrical audio signal transmission systems. (Lines With Other Classes and Within This Class).
- 455, Telecommunications, appropriate subclasses for modulated carrier wave speech communications, and for modulated carrier wave communication systems and devices. (Lines With Other Classes and Within This Class).
- 505, Superconductor Technology: Apparatus, Material, Process, subclasses 150+ for high temperature ( $T_c > 30$  K) superconducting devices, and particularly subclasses 202+ for electric communication system containing transmitter or receiver of pulse, digital, or electromagnetic radio, television, or radar wave form.
- 600, Surgery, subclass 559 for audiometers (ear or testing by auditory stimulus).
- 623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclass 9 for mechanical artificial larynxes.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 200+ for speech signal processing using a computer.

#### SUBCLASSES

- 1 BINAURAL AND STEREOPHONIC:**  
This subclass is indented under the class definition. Subject matter where there are two or more independent sound signals which are to be separately reproduced so as to create a sense of depth.
- (1) Note. 'Sound signals' are electric signals representing sounds.
- (2) Note. Stereophonic or pseudo stereophonic systems are classified here, not in Class 370.
- SEE OR SEARCH CLASS:  
360, Dynamic Magnetic Information Storage or Retrieval, for magnetically recording or reproducing stored stereophonic information.

- 369, Dynamic Information Storage or Retrieval, subclasses 85+ for recording or reproducing stored stereophonic information.
- 370, Multiplex Communications, appropriate subclasses for multiplex in general.

#### 2

##### **Broadcast or multiplex stereo:**

This subclass is indented under subclass 1. Subject matter for the broadcasting or transmission of two or more independent sound signals which are to be reproduced so as to create a sense of depth.

##### SEE OR SEARCH CLASS:

- 360, Dynamic Magnetic Information Storage or Retrieval, for magnetically recording or reproducing stored stereophonic information.
- 369, Dynamic Information Storage or Retrieval, subclasses 85+ for recording or reproducing stored stereophonic information.
- 370, Multiplex Communications, appropriate subclasses for multiplex in general.
- 455, Telecommunications, appropriate subclasses for broadcast, nonstereo radio communications.

#### 3

##### **FM final modulation:**

This subclass is indented under subclass 2. Subject matter where stereophonic signals are broadcast by means of a radio carrier wave which is only frequency modulated.

- (1) Note. There may also be an amplitude modulated subcarrier.

##### SEE OR SEARCH CLASS:

- 455, Telecommunications, subclasses 42+, 93, 110+, and 205+ for frequency modulated carrier wave communications in general.

#### 4

##### **AM subcarrier:**

This subclass is indented under subclass 3. Subject matter where a carrier wave is frequency modulated by a subcarrier which has been amplitude modulated by a signal.

- 5 Four discrete channels:**  
This subclass is indented under subclass 4. Subject matter where the independent sound signals are four in number.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
19+, for quadrisonic sound systems in general.
- 6 Having transmitter:**  
This subclass is indented under subclass 5. Subject matter including means for generating and modulating a carrier wave by a stereophonic signal and usually including the coupling of the modulated carrier wave to the transmission medium.
- SEE OR SEARCH CLASS:  
455, Telecommunications, subclasses 39 through 129 for radio transmitters in general.
- 7 Switch-type detector or modulator:**  
This subclass is indented under subclass 4. Subject matter having a detector or modulator which extracts information from or adds information to an input waveform only at instants determined by a selector pulse.
- 8 Two diodes:**  
This subclass is indented under subclass 7. Subject matter in which the detector or demodulator is limited to containing, two diodes.
- 9 Four or more diodes:**  
This subclass is indented under subclass 7. Subject matter in which the detector or demodulator contains at least four diodes.
- 10 Channel separation control:**  
This subclass is indented under subclass 4. Subject matter where there is control over the electrical or acoustical difference between the independent sound signals.
- 11 Automatic switchover between mono and stereo modes:**  
This subclass is indented under subclass 4. Subject matter where a receiver is changed from a monaural receiver to a stereophonic receiver in response to the presence of a stereophonic signal at its input.
- 12 Stereo indicators (e.g., stereo presence):**  
This subclass is indented under subclass 4. Subject matter having an indicator which gives an indication in response to the presence of a stereophonic signal.
- 13 Antinoise:**  
This subclass is indented under subclass 4. Subject matter having provision for the reduction or elimination of an unwanted signal.
- SEE OR SEARCH CLASS:  
455, Telecommunications, subclasses 63.1 through 65, 222-224, 283-288, 296-312, and subclasses 501-506 for noise elimination in radio communications in general.
- 14 Having transmitter:**  
This subclass is indented under subclass 4. Subject matter including means for generating and modulating a carrier wave by a stereophonic signal and usually including the coupling of the modulated carrier wave to the transmission medium.
- SEE OR SEARCH CLASS:  
455, Telecommunications, subclasses 39 through 129 for radio transmitters in general.
- 15 AM or both AM and angle final modulation:**  
This subclass is indented under subclass 2. Subject matter having a carrier wave which is amplitude modulated and which may also be angle modulated.
- 16 Having transmitter:**  
This subclass is indented under subclass 15. Subject matter including means for generating and modulating a carrier wave by a stereophonic signal and usually including the coupling of the modulated carrier wave to the transmission medium.
- SEE OR SEARCH CLASS:  
455, Telecommunications, subclasses 39 through 129 for radio transmitter in general.

- 17 Pseudo stereophonic:**  
This subclass is indented under subclass 1. Subject matter having a device or arrangement which transforms single channel audio signals into a plurality of channels of audio information to create a sense of depth.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
63+, for reverberators, which are often used to create a stereophonic effect.
- 18 Pseudo quadrasonic:**  
This subclass is indented under subclass 17. Subject matter where the plurality of channels are four in number.
- 19 Quadrasonic:**  
This subclass is indented under subclass 1. Subject matter in which four independent sound signals are to be reproduced.
- 20 Matrix:**  
This subclass is indented under subclass 19. Subject matter where the four independent sound signals are either (1) combined or coded to give one or more complex signals or (2) one or more complex signals are combined or decoded to recover the four independent sound signals.
- 21 4-2-4:**  
This subclass is indented under subclass 20. Subject matter where four quadrasonic signals are multiplexed into two more complex signals, then expanded back into four signals.
- 22 Variable decoder:**  
This subclass is indented under subclass 21. Subject matter where the two more complex signals are combined in variable ratios in order to recover the four independent sound signals.
- 23 With encoder:**  
This subclass is indented under subclass 21. Subject matter where the four independent sound signals are combined or coded to give two complex signals.
- 23.1 Hearing aid:**  
This subclass is indented under subclass 1. Subject matter having a small ambient sound reproducing system wherein two or more out-put transducers transmit independent sound signals directly into the ear or skull for use by a hearing impaired individual to increase the sound level received by the ear (i.e., listening assistance).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
68+, and the search notes therein for hearing aids, in general.
- 26 Stereo sound pickup device (microphone):**  
This subclass is indented under subclass 1. Subject matter including a single transducer system for converting sound waves into two or more independent sound signals.
- 27 Center channel:**  
This subclass is indented under subclass 1. Subject matter where a third sound signal is derived from combination of two independent sound signals.
- 28 Amplifier:**  
This subclass is indented under subclass 1. Subject matter including a device to increase the amplitude of the independent sound signals.
- SEE OR SEARCH CLASS:  
330, Amplifiers, appropriate subclasses for an amplifier not having a specific source of input signals or a specific load.
- 54 HELIUM SPEECH:**  
This subclass is indented under the class definition. Subject matter where an output speech signal is of differing apparent predominant frequency but of the same duration as the input speech signal.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
29+, for bandwidth compression or expansion of a speech signal.
- 55 AUDIO TRANSDUCER PROTECTION CIRCUITRY:**  
This subclass is indented under the class definition. Subject matter where there is an audio transducer and circuitry to protect the transducer from damage due to abnormal operating conditions.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

111+, for systems having specific audio transducers.

SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclasses 1+ for circuitry to protect other systems and devices in general from damage due to abnormal operating conditions.

**56 MONITORING OF SOUND:**

This subclass is indented under the class definition. Subject matter having a qualitative (yes-no) indication dependent upon a parameter of sound waves, e.g., loudness, quality, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

58+, for monitoring the operation of audio devices.

77+, for systems having a microphone at a location remote from a listening location (i.e., one-way intercoms).

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 570+ for measuring and testing sound waves where a quantitative (numerical) indication is given, especially 645+ for measuring an acoustic parameter.

367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 135+ for acoustic wave receiver circuitry.

**57 Amplification control responsive to ambient sound:**

This subclass is indented under subclass 56. Subject matter where the ambient sound level, at a place where sound is being reproduced, is evaluated and the result used to control the volume of the reproduced sound.

**58 MONITORING/MEASURING OF AUDIO DEVICES:**

This subclass is indented under the class definition. Subject matter having an indicator, measuring device, or eavesdropping means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

56+, for monitoring of sound waves.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclasses 500+ for condition responsive alarms.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses 712+ for testing transmission facilities.

**59 Loudspeaker operation:**

This subclass is indented under subclass 58. Subject matter where an operating parameter of a sound reproducing transducer is measured or indicated.

**60 Testing of hearing aids:**

This subclass is indented under subclass 58. Subject matter in which at least part of a hearing aid is tested.

(1) Note. A hearing aid is a small audio reproducing system for the hard of hearing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

68+, for hearing aids.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 570+ for measuring vibration including sound waves.

324, Electricity: Measuring and Testing, for electrical testing or measuring in general.

370, Multiplex Communications, subclasses 241+ for multiplex testing.

455, Telecommunications, subclasses 67.11 through 67.7 for modulated carrier system testing, subclasses 115.1-115.4 for transmitter testing; and subclasses 226.1-226.4 for receiver testing.

**61 SOUND EFFECTS:**

This subclass is indented under the class definition. Subject matter where the audio signal is selectively distorted.

- SEE OR SEARCH CLASS:  
369, Dynamic Information Storage or Retrieval, subclasses 174+ for signal modification in a recording system.
- 62 Tremolo or vibrato effects:**  
This subclass is indented under subclass 61. Subject matter having means to produce a rapid variation in amplitude or pitch of a signal.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
63, for means to introduce echoes into a signal.
- SEE OR SEARCH CLASS:  
84, Music, subclass 1.25 for producing vibrato in an electronic musical instrument.  
181, Acoustics, subclass 143 for a moving sound producer or deflector which can produce tremolo effects.
- 63 Reverberators:**  
This subclass is indented under subclass 61. Subject matter having a device for producing echoes in the audio signal.
- SEE OR SEARCH CLASS:  
84, Music, subclass 1.24 for reverberation production in electronic musical instruments, and digest 26 for musical reverberation.  
181, Acoustics, subclasses 123+ for echo system.  
333, Wave Transmission Lines and Networks, subclasses 138 through 164 for delay lines.  
360, Dynamic Magnetic Information Storage or Retrieval, subclass 7 for recording for momentary delay to produce echoes.  
369, Dynamic Information Storage or Retrieval, subclass 60.01 for using a recording system to delay a signal.
- 64 Mechanical (e.g., reverberation chamber):**  
This subclass is indented under subclass 63. Subject matter where the echoes are produced by other than electrical means.
- 65 Helical spring:**  
This subclass is indented under subclass 64. Subject matter where the echoes are produced by reflecting a compressional sound wave along a helical spring.
- 66 DEREVEBERATORS:**  
This subclass is indented under the class definition. Subject matter for removing echoes from a sound signal.
- 67 STETHOSCOPIES, ELECTRICAL:**  
This subclass is indented under the class definition. Subject matter forming an instrument used to convey sounds to the ear of a user.
- (1) Note. If the instrument is particularly adapted for use on or in a living body, classification is in Class 128, Surgery, but if the instrument can be used generally (e.g., to detect leaks or the internal sounds of machinery) classification is here.
- SEE OR SEARCH CLASS:  
181, Acoustics, subclass 131 for mechanical stethoscopes.  
600, Surgery, subclass 528 for specific structure, adapted to be placed on or in a living body, for detecting sounds emanating from the heart.
- 70 ARTIFICIAL LARYNX, ELECTRICAL:**  
This subclass is indented under the class definition. Subject matter for replacing or supplementing the larynx and involving electrical actuation.
- SEE OR SEARCH CLASS:  
84, Music, subclass 375 for imitation trumpets, jew's harps, and reed horns of variable pitch.  
116, Signals and Indicators, subclasses 137+ for horns, whistles and compressional wave generators.  
128, Surgery, subclasses 207.14+ for tubes to be inserted into the trachea or larynx.  
181, Acoustics, pertinent subclasses for sound amplifying and transmitting means and methods.

- 446, Amusement Devices: Toys, subclasses 297+ for a toy having means to emit sound imitating a voice.
- 472, Amusement Devices, particularly subclass 64 for an illusion caused by sound imitation or effect.
- 623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclasses 24+ for electrically actuated artificial body members other than a larynx and subclass 9 for nonelectrical artificial larynxes.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 258+ for speech signal synthesis and subclass 271 for speech signal processing applied to a handicap aid.
- 71.1 ACOUSTICAL NOISE OR SOUND CANCELLATION:**  
This subclass is indented under the class definition. Subject matter, not elsewhere classifiable, comprising a noise cancellation system where audible noise is at least partially eliminated by generating and acoustically emitting an out-of-phase replica of an offending sound.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
73.1, for sound or noise masking.  
94.1+, for suppression of the effects of unwanted signals on desired signals.
- SEE OR SEARCH CLASS:  
415, Rotary Kinetic Fluid Motors or Pumps, subclass 119 for noise elimination in fans, turbines, jet engines, etc.
- 71.11 Adaptive filter topology:**  
This subclass is indented under subclass 71.8. Subject matter having the functional interconnections between two or more transfer function models which make up an overall circuit or computational arrangement designed to generate a counterwave.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
71.13, for the generation of the out-of-phase replica using analog circuitry or non-adaptive filter.
- SEE OR SEARCH CLASS:  
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 322+ for adaptive digital filter structures, per se.
- 71.12 Algorithm or formula (e.g., LMS, Filtered-X, etc.):**  
This subclass is indented under subclass 71.8. Subject matter having a specific computational sequence or a mathematical formula used in computation of a counterwave.
- 71.13 Analog or nonadaptive:**  
This subclass is indented under subclass 71.8. Subject matter in which the out-of-phase replica is generated using either analog circuitry or an electrical circuit having a fixed transfer function.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
71.11, for the generation of a counterwave using adaptive filter topology.
- 71.14 Tonal noise or particular frequency or band:**  
This subclass is indented under subclass 71.8. Subject matter in which the noise cancellation system is particularly designed to either eliminate noise having a high degree of underlying periodicity or process noise at a particular frequency or within a limited or particular frequency band.
- 71.2 Acoustic, nonairborne vibration sensing or counterwave emission:**  
This subclass is indented under subclass 71.1. Subject matter which senses vibration from or which imparts a cancelling wave directly to a solid or liquid medium or structure.
- (1) Note. In order to be properly classifiable here, the primary object should be attenuation of acoustic sounds. In most cases, this will mean that a sensor such as a microphone will be needed to detect sound propagated through air, such as

the residual sound after the counterwave source's output has been acoustically summed with the original noise.

**SEE OR SEARCH CLASS:**

- 52, Static Structures (e.g., Buildings), subclass 167.1 + for means compensating for an earth-transmitted force, i.e., earthquake.
- 267, Spring Devices, subclasses 136+ for resilient shock or vibration absorbers. See especially subclasses 140.14 and 140.15 for subject matter including electronic or magnetic control, or subclass 140.11 for subject matter having an energy absorbing feature.

**71.3 From appliance:**

This subclass is indented under subclass 71.1. Subject matter wherein the noise cancellation system cancels noise emanating from a device such as an air conditioner, refrigerator, vacuum cleaner, etc.

**71.4 Within cabin or compartment of vehicle:**

This subclass is indented under subclass 71.1. Subject matter wherein the noise cancellation system cancels noise within a humanly occupied space of an aircraft, automobile, etc.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 86, for electrical audio systems combined with vehicles.

**71.5 Within duct:**

This subclass is indented under subclass 71.1. Subject matter wherein the noise cancellation system cancels noise propagating in a tube, canal, pipe, or similar conduit, including automobile inlet and exhaust pipes.

**71.6 Adjacent ear:**

This subclass is indented under subclass 71.1. Subject matter wherein the noise cancellation system is associated with a structure in a manner designed to cancel noise in the immediate vicinity of a person's ears.

- (1) Note. Structures included in this subclass are headrests, hearing protectors, etc. Hearing protectors based on active noise cancellation are classified herein.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 72, for hearing protector without noise cancellation.

**71.7 Particular transducer or enclosure structure:**

This subclass is indented under subclass 71.1. Subject matter specifying details of an electro-acoustic energy converter or housing for use in an active noise cancellation system.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 88+, for enclosure or housing.  
150+, for electro-acoustic audio transducer.

**71.8 Counterwave generation control path:**

This subclass is indented under subclass 71.1. Subject matter having either a feedback or feedforward circuit or a sequence of computations to generate the out-of-phase replica of the offending noise.

**71.9 Non-acoustically derived reference signal:**

This subclass is indented under subclass 71.8. Subject matter in which a transducer used to obtain a signal for processing detects a form of energy other than sound vibration.

- (1) Note. Examples are spark timing, crankshaft position, manifold pressure of an engine, etc.

**72 HEARING PROTECTORS, ELECTRICAL:**

This subclass is indented under the class definition. Subject matter which provides a barrier to the transmission of at least some sounds to the ear.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 68+, for hearing aids, electrical.

**73.1 SOUND OR NOISE MASKING:**

This subclass is indented under the class definition. Subject matter which utilizes sound to reduce the distractive influences of unwanted sound or other audible noise.

- (1) Note. The unwanted sound may include intelligence bearing sound (e.g., conversation).

SEE OR SEARCH CLASS:

- 128, Surgery, subclass 1 for pain reducing or relaxation inducing sound.  
380, Cryptography, subclasses 252 through 254 for an electrical audio signal masked for concealment by another signal.

**74 HEADPHONE CIRCUITS:**

This subclass is indented under the class definition. Subject matter having means to perform a desired electrical or electronic function in conjunction with a device held against the ear having a diaphragm which vibrates according to current variations.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 68, for electrical hearing aids.

**75 MEGAPHONES:**

This subclass is indented under the class definition. Subject matter for amplifying the human voice and which is capable of being carried.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 74, for headphone circuits.

SEE OR SEARCH CLASS:

- 181, Acoustics, subclasses 177+ for sound intensifying horns.

**76 LECTERNS:**

This subclass is indented under the class definition. Subject matter having an enclosure in the form of a reading desk.

- (1) Note. Excluded from here are lecterns which have no electric audio signal processing circuitry.

SEE OR SEARCH CLASS:

- 312, Supports: Cabinet Structure, appropriate subclasses for lecterns, per se.  
362, Illumination, appropriate subclasses of light sources for use with lecterns.

**77 ONE-WAY AUDIO SIGNAL PROGRAM DISTRIBUTION:**

This subclass is indented under the class definition. Subject matter for delivering the output of an audio signal source to a remote location, or to a plurality of electric-signal-to-sound transducers.

SEE OR SEARCH CLASS:

- 340, Communications: Electrical, subclasses 4.5 and 4.51 for stock quotation systems.  
370, Multiplex Communications, subclasses 486+ for multiplex program distribution systems.  
455, Telecommunications, subclasses 3.01 through 3.06 for radio program distribution systems.  
725, Interactive Video Distribution Systems, subclasses 135 through 153 for one-way video program distribution.

**78 Drive-in:**

This subclass is indented under subclass 77. Subject matter for providing one-way communication between a central location and one or more stations accessible to occupants of automobiles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 87+, for audio systems having nonelectrical features such as mountings, housings etc.

**79 Near field:**

This subclass is indented under subclass 77. Subject matter which is a near field or limited range system (i.e., field strength  $1/d$  where  $d$  = distance from the transmitter to the receiver) where signal transfer from transmitter to receiver is inductive or capacitive rather wired.

SEE OR SEARCH CLASS:

- 455, Telecommunications, subclass 41.1 for near field modulated carrier wave systems.

**80 Multiple channel:**

This subclass is indented under subclass 77. Subject matter having more than one audio signal path.

- are classified in Class 340, Communications: Electrical, subclasses 425.5+.
- 81 With switching:**  
This subclass is indented under subclass 80. Subject matter where there is the making, breaking or changing connections between audio signal paths.
- 82 Public address system:**  
This subclass is indented under subclass 77. Subject matter having an input transducer to convert sound into an electrical signal and an output transducer converting the electrical signal into sound so that the sound can be heard over a large area.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
75, for megaphones.
- SEE OR SEARCH CLASS:  
369, Dynamic Information Storage or Retrieval, subclasses 1+ for public address systems combined with recording reproducers.
- 83 Feedback suppression:**  
This subclass is indented under subclass 82. Subject matter having provision for preventing audio coupling from loudspeaker to microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
93, for feedback suppression in audio systems in general.
- 84 Spare amplifier substitution:**  
This subclass is indented under subclass 82. Subject matter having provision for substituting one amplifier for another.
- 85 Speaker or channel switching:**  
This subclass is indented under subclass 82. Subject matter having provision for changing audio signal paths or audio reproducers.
- 86 VEHICLE:**  
This subclass is indented under the class definition. Subject matter with a vehicle.
- (1) Note. Classified here are electrical audio systems combined with vehicles, other communication devices with vehicles
- 87 HAVING NON-ELECTRICAL FEATURE (E.G., MOUNTING):**  
This subclass is indented under the class definition. Subject matter including a mechanical adjunct or device such as a mounting means or a specific container for electrical components.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
386+, for a mounting or support feature of a housed loudspeaker.
- 89 Loudspeakers driven in given phase relationship:**  
This subclass is indented under subclass 87. Subject matter where there are a plurality of loudspeakers in the specific container which are driven such as that their output sound has a particular phase relationship.
- 91 Having microphone:**  
This subclass is indented under subclass 87. Subject matter where the specific container holds a microphone.
- (1) Note. There are both claimed electrical features in this subclass as well as non-electrical features.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
111+, for circuitry combined with a specific type of microphone.  
122, for a microphone combined with an element having a diverse function, e.g., an amplifier.  
355, for a housed microphone.  
369, for a microphone capsule, per se.  
375, for a microphone in particular support structure, wherein there is no claimed electrical feature of the transducer.
- SEE OR SEARCH CLASS:  
340, Communications: Electrical, subclasses 425.5+, note especially subclasses 460 and 474 for vehicle with horn, siren, or other electrical communication means not elsewhere provided for.  
455, Telecommunications, subclasses 345+ for a vehicle mounted radio receiver.

**92 DIRECTIVE CIRCUITS FOR MICROPHONES:**

This subclass is indented under the class definition. Subject matter including a circuit for imparting directional pickup characteristics to microphones.

SEE OR SEARCH THIS CLASS, SUBCLASS:

155, for a directional microphone, per se.

**93 FEEDBACK SUPPRESSION:**

This subclass is indented under the class definition. Subject matter for prevention or reduction of an output signal from being returned to an input.

SEE OR SEARCH THIS CLASS, SUBCLASS:

83, for feedback suppression in a public address system.

95, for a microphone system having feedback.

96, for a loudspeaker system having feedback.

**94.1 NOISE OR DISTORTION SUPPRESSION:**

This subclass is indented under the class definition. Subject matter with provisions for reducing the effects of an unwanted signal on a desired signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

13, for antinoise means in broadcast or multiplex stereo systems.

71.1+, for acoustical noise or sound cancellation.

73.1, for audio masking.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 551+ for unwanted signal suppression.

708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 300+ for digital selection or rejection of signal components and subclass 819 for filtering electrical signals by analog computation.

**94.2 Spectral adjustment:**

This subclass is indented under subclass 94.1. Subject matter in which the unwanted signal is either at least partially removed by processing a selected frequency or frequency band, such as by subtracting the contents of a particular frequency band from the input signal, or is overcome by preemphasis of a particular frequency or band to enhance the signal to noise ratio.

SEE OR SEARCH THIS CLASS, SUBCLASS:

83, for feedback elimination in a public address system (this is frequently done by spectral subtraction using notch filters, for example).

93, for feedback elimination in an audio system under the class definition.

94.7, for noise suppression using a signal channel and noise channel.

98+, for control of frequency characteristics in an audio signal in general, such as for equalization.

106, for compression/expansion ("compression") systems, which achieve enhanced signal to noise ratio through compression. Preemphasis is often found with compression.

**94.3 In multiple frequency bands:**

This subclass is indented under subclass 94.2. Subject matter in which processing takes place in more than one spectral region, i.e., more than one frequency or frequency band is processed.

**94.4 Interpolation:**

This subclass is indented under subclass 94.1. Subject matter in which a segment of a desired signal which contains noise is replaced with an estimate of what it would or should have been in the absence of noise, the estimate being based on the desired signal's values before or after, or before and after, the noise occurred.

SEE OR SEARCH CLASS:

702, Data Processing: Measuring, Calibrating, or Testing, subclasses 189+ for measured signal processing including weighting, averaging, and matrix operation.

708, Electrical Computers: Arithmetic Processing and Calculating, subclass 290 for interpolation, per se.

**94.5 Soft switching, muting, or noise gating:**

This subclass is indented under subclass 94.1. Subject matter designed to prevent a momentary, sudden fluctuation of voltage or current (a "pop") in a circuit as a result of a sudden change of an operating parameter in the circuit, such as the application of power; or to attenuate or cutoff on a broad-band basis the audio output of a circuit when the audio signal does not contain intelligence; or to switch off the signal input to a system when the signal or noise level on the input is above a certain threshold (a condition which usually indicates that only noise is present).

SEE OR SEARCH THIS CLASS, SUBCLASS:

94.8, for peak limiting or pulsive noise compensation.

SEE OR SEARCH CLASS:

455, Telecommunications, subclasses 194.1+ for muting and subclasses 218+ for squelch.

**94.6 Hum or ground loop:**

This subclass is indented under subclass 94.1. Subject matter designed to eliminate frequency components generated as a result of AC power supply contamination, or compensate for noise transmission caused by currents flowing through an electrical conductor which connects two different circuit points, each of which is nominally at ground potential.

SEE OR SEARCH CLASS:

330, Amplifiers, subclass 149 for hum or noise or distortion bucking introduced into signal channel.

455, Telecommunications, subclasses 298+ for noise or interference elimination in the receiver power supply.

**94.7 Using signal channel and noise channel:**

This subclass is indented under subclass 94.1. Subject matter having separate inputs, each respectively containing primarily the desired and undesired signals, and which derives at least one "clean" output having the desired sig-

nal by utilizing both inputs, such as by subtracting one input from the other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

94.2, for noise suppression using spectral adjustment.

**94.8 Peak limiting or pulsive noise compensation:**

This subclass is indented under subclass 94.1. Subject matter designed to restrict the amplitude of relatively short duration, high amplitude excursions of a desired signal to prevent distortion in a subsequent stage such as a modulator or amplifier, or compensate for the effects of sporadic or short duration undesired signals ("pulses").

SEE OR SEARCH THIS CLASS, SUBCLASS:

94.5, for soft switching, muting, or noise gating.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 310+ for limiting, clipping, or clamping lessens or eliminates an intermittent spuriously generated component from a signal.

455, Telecommunications, subclasses 223+ for noise blanking.

**94.9 Feedforward circuitry for transducer compensation:**

This subclass is indented under subclass 94.1. Subject matter having circuitry designed to compensate for distortion which is generated by a transducer itself (such as a loudspeaker or microphone), without using feedback.

SEE OR SEARCH THIS CLASS, SUBCLASS:

95, for microphones with feedback.

96, for systems which compensate for loudspeaker distortion using feedback.

**95 MICROPHONE FEEDBACK:**

This subclass is indented under the class definition. Subject matter having a microphone and a circuit and also having provision for returning a fraction of an output signal of the circuit to an input of the circuit.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 93, for feedback suppression in audio systems.  
 96, for a loudspeaker circuit with feedback.  
 168+, for a microphone, per se.
- 96 LOUDSPEAKER FEEDBACK:**  
 This subclass is indented under the class definition. The mechanical or electromechanical coupling of a portion of a sound wave output of a system to a preceding part or input circuit of the system.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 93, for feedback suppression in audio systems.  
 95, for microphones with feedback.  
 150+, for a loudspeaker, per se.
- 97 INCLUDING PHASE CONTROL:**  
 This subclass is indented under the class definition. Subject matter with means to vary or maintain the phase of an electrical signal relative to either another signal or a standard.
- 98 INCLUDING FREQUENCY CONTROL:**  
 This subclass is indented under the class definition. Subject matter with means to vary or maintain the frequency response of the system.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 62, for vibrato effects.
- SEE OR SEARCH CLASS:  
 333, Wave Transmission Lines and Networks, subclasses 165 through 212 for filters, per se.  
 455, Telecommunications, subclasses 255+, 266 and 268 for frequency response control in radio receivers.
- 99 Having crossover filter:**  
 This subclass is indented under subclass 98. Subject matter that separates a signal into two or more separate frequency bands.
- SEE OR SEARCH CLASS:  
 333, Wave Transmission Lines and Networks, subclasses 132+ for crossover networks, per se.  
 369, Dynamic Information Storage or Retrieval, subclass 175 for record players with frequency dependent signal separation.
- 100 With active device:**  
 This subclass is indented under subclass 99. Subject matter having an electrical or electronic element capable of controlling voltages or currents to produce gain or switching action in a circuit (e.g., transistor, vacuum tube, or saturable reactor).
- 101 Automatic tone control:**  
 This subclass is indented under subclass 98. Subject matter having a control used to alter automatically the frequency response of the system so that a listener can be provided the most pleasing sound.
- SEE OR SEARCH CLASS:  
 333, Wave Transmission Lines and Networks, subclasses 28, and 167-212 for tone control, per se.  
 455, Telecommunications, subclass 267 for tone control in a radio receiver.
- 102 With amplitude control:**  
 This subclass is indented under subclass 101. Subject matter including automatic tone control combined with means for adjusting or setting the signal level or for obtaining a substantially constant amplitude output signal for a range of variations of the amplitude of an input signal.
- SEE OR SEARCH CLASS:  
 455, Telecommunications, subclass 233.1 for combined volume and tone control in a radio receiver.
- 103 Having automatic equalizer circuit:**  
 This subclass is indented under subclass 98. Subject matter designed to compensate for an undesired amplitude-frequency and/or phase-frequency characteristic of the system.

## SEE OR SEARCH CLASS:

- 333, Wave Transmission Lines and Networks, subclass 28 for equalizers, per se.
- 369, Dynamic Information Storage or Retrieval, subclass 133 for recording with equalization.

**104 INCLUDING AMPLITUDE OR VOLUME CONTROL:**

This subclass is indented under the class definition. Subject matter including means for adjusting or setting the signal level or for obtaining a substantially constant amplitude output signal for a range of variations of the amplitude of an input signal.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 102, for amplitude control combined with automatic tone control.

## SEE OR SEARCH CLASS:

- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 306+ for miscellaneous amplitude control circuits.
- 330, Amplifiers, subclasses 129+, 254 and 278+ for amplitude control for amplifiers.
- 338, Electrical Resistors, subclasses 13+ and 68+ for variable resistors.
- 455, Telecommunications, subclasses 232.1+ for amplitude control in a radio receiver.

**105 Remote:**

This subclass is indented under subclass 104. Subject matter where the amplitude or volume is controlled by at least one or more devices from a remote point.

## SEE OR SEARCH CLASS:

- 340, Communications: Electrical, subclasses 1.1 through 16.1 for remote control, in general.
- 369, Dynamic Information Storage or Retrieval, subclasses 24.01 through 42.01 for remote control of a recording or reproducing device other than by a telephone system.

- 455, Telecommunications, subclass 355 for remote amplitude or volume control in a radio receiver.

**106 With amplitude compression/expansion:**

This subclass is indented under subclass 104. Subject matter having electrical audio signal system combined with provision for decreasing the amplitude range of an applied audio signal or for restoring the full amplitude range of an amplitude compressed audio signal.

## SEE OR SEARCH CLASS:

- 333, Wave Transmission Lines and Networks, subclass 14 for amplitude compression/expansion, per se.
- 370, Multiplex Communications, subclass 202 for amplitude compression or expansion in a multiplex system.
- 455, Telecommunications, subclass 72 for amplitude compression/expansion in a radio system.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 500+ for audio signal bandwidth compression or expansion and subclasses 503+ for audio signal time compression or expansion.

**107 Automatic:**

This subclass is indented under subclass 104. Subject matter having means to control the signal level adjusting means automatically as a function of some characteristic of an input signal.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 22, for automatic gain control for decoding quadrasonic signals.

**108 Including feedback:**

This subclass is indented under subclass 107. Subject matter further having provision for returning a fraction of an output signal back to an input.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 83, for feedback suppression in a public address system.

- 93, for feedback suppression in a audio systems in general.
- 95, for microphone circuits with feedback.
- 96, for loudspeaker circuits with feedback.
- 109 With manual volume control:**  
This subclass is indented under subclass 104. Subject matter wherein volume is controlled in accordance with the position of a device which is adjusted by hand.
- 110 VOICE CONTROLLED:**  
This subclass is indented under the class definition. Subject matter which is controlled in some manner in response to a voice signal.
- SEE OR SEARCH CLASS:  
367, Communications, Electrical: Acoustic Wave Systems and Devices, subclass 198 for speech responsive selective control in general.
- 111 CIRCUITRY COMBINED WITH SPECIFIC TYPE MICROPHONE OR LOUSPEAKER:**  
This subclass is indented under the class definition. Subject matter combined with a specific audio-to-electrical signal or electrical-to-audio transducer.
- (1) Note. Classified herein are microphone or loudspeakers combined with a diverse type of circuit (e.g., amplifier) or circuit element (e.g., resistor) other than a lead or connector.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
122, for audio signal systems having a generic microphone.  
150+, for a specific type of microphone or loudspeaker.
- 112 With carbon microphone:**  
This subclass is indented under subclass 111. Subject matter where the transducer is a carbon microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
180+, for a carbon microphone, per se.
- 113 With electrostatic microphone:**  
This subclass is indented under subclass 111. Subject matter where the transducer is an electrostatic microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
173, for an electrostatic microphone, per se.
- 114 With piezoelectric microphone:**  
This subclass is indented under subclass 111. Subject matter where the transducer is a piezoelectric microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
173, for a piezoelectric microphone, per se.
- SEE OR SEARCH CLASS:  
310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric transducers.  
367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 157+ for underwater type piezoelectric transducers.
- 115 With magnetic microphone:**  
This subclass is indented under subclass 111. Subject matter where the transducer is a magnetic microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
176, for a magnetic microphones, per se.
- 116 With electrostatic loudspeaker:**  
This subclass is indented under subclass 111. Subject matter where the transducer is an electrostatic loudspeaker.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
191+, for an electrostatic loudspeakers, per se.
- 117 With magnetic loudspeaker:**  
This subclass is indented under subclass 111. Subject matter where the transducer is a magnetic loudspeaker.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
192+, for a magnetic loudspeaker, per se.
- 118 WITH MUSICAL INSTRUMENT:**  
This subclass is indented under the class definition. Subject matter for amplifying or reproducing the sounds of musical instruments.
- (1) Note. The subject matter classified herein merely receives, amplifies and/or reproduces signals representing musical sounds while the subject matter classified in Class 84 generates musical sounds.
- SEE OR SEARCH CLASS:  
84, Music, subclasses 1+ for musical instruments, especially subclasses 1.01+ for electronic musical instruments.
- 119 WITH MIXER:**  
This subclass is indented under the class definition. Subject matter including a circuit having two or more inputs and a common output which combines separate input signals linearly in desired proportions to produce an output signal.
- 120 WITH AMPLIFIER:**  
This subclass is indented under the class definition. Subject matter including a device for producing an output of greater amplitude than is applied at an input.
- SEE OR SEARCH CLASS:  
330, Amplifiers, appropriate subclasses for amplifiers not having specific input signals or specific loads.  
379, Telephonic Communications, subclass 395 for amplifiers combined with telephone systems.
- 121 Feedback:**  
This subclass is indented under subclass 120. Subject matter where a fraction of an output signal is returned to an input.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
71.1+, for acoustical sound cancellation.
- 83, for public address systems with feedback suppression.  
93, for feedback suppression for audio systems in general.  
95, for microphone circuits with feedback.  
96, for loudspeaker circuits with feedback.  
108, for automatic amplitude control having feedback.
- 122 HAVING MICROPHONE:**  
This subclass is indented under the class definition. Subject matter including a generic microphone combined with an element having diverse function (e.g., a microphone and an amplifier).
- (1) Note. Subject matter under the class definition having a specific microphone combined with a diverse element is found in subclasses 111+.
- (2) Note. Microphones are also found in the subject matter of subclasses 26, 55-58, 64+, 67-69, 75-85, 91, and 95.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
168+, for a microphone, per se.
- 123 SWITCHING:**  
This subclass is indented under the class definition. Subject matter where there is the making, breaking or changing connections in an electrical circuit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
7+, for switch type stereo modulators or detectors.  
11, for switching between mono and stereo modes.  
55, for audio transducer protection circuitry.  
81, for switching in multiple channel program distribution.  
85, for speaker or channel switching in a public address system.  
110, for voice controlled switching of audio systems.

## SEE OR SEARCH CLASS:

- 200, Electricity: Circuit Makers and Breakers, for switches, per se.
- 307, Electrical Transmission or Interconnection Systems, subclasses 112+ for electrical transmission or interconnection switching systems.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 365+ for miscellaneous gating circuits including channel selection.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets for magnetic switches.
- 340, Communications: Electrical, subclass 2.9 for spare channel switching.
- 361, Electricity: Electrical Systems and Devices, subclasses 139+ for relay or solenoid circuits.
- 370, Multiplex Communications, subclasses 357+ for multiplex switching circuit.
- 379, Telephonic Communications, subclasses 242+ for switching in telephone systems, and subclass 325 for telephone switches, per se.
- 455, Telecommunications, subclasses 78+ for transmitter-receiver switching.
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 3+ for replacing a faulty apparatus with a spare.

**124 MISCELLANEOUS:**

This subclass is indented under the class definition. Subject matter not hereinabove classified.

**150 ELECTRO-ACOUSTIC AUDIO TRANSDUCER:**

This subclass is indented under the class definition. Subject matter having a structure or process for converting an information signal between audible sound vibrations and a corresponding time-varying electrical quantity.

- (1) Note. Included herein are instruments such as microphones, speakers earphones, and housings or supports peculiar thereto. However, combinations with circuitry, other than leads, terminals, or connectors, are not classified

herein, but are classified in the preceding subclasses of this class (381).

- (2) Note. The audible sound vibrations are generally speech or music.

## SEE OR SEARCH CLASS:

- 181, Acoustics, appropriate subclasses for an attachment to a casing of an audio transducer.
- 310, Electrical Generator or Motor Structure, subclasses 300+ for a piezoelectric transducer not limited to audio utility.
- 367, Communications, Electrical: Acoustic Wave System and Devices, subclasses 140+ for a nonaudio acoustical transducer.

**151 Body contact wave transfer (e.g., bone-conduction earphone, larynx microphone):**

This subclass is indented under subclass 150. Subject matter wherein sound vibrations are obtained from or imparted to a portion of a human body in direct contact with a vibrating component of an electroacoustical transducer.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 68.3, for similar subject matter used in a hearing aid.

**152 Driven diverse static structure (e.g., wall, sounding board):**

This subclass is indented under subclass 150. Subject matter combined with a stationary structural element having a function independent of electricity-to-sound conversion and being driven to radiate sound waves by an audio transducer mounted thereon.

- (1) Note. Devices which vibrate walls to emit intelligible sound are classified herein.

**160 Reflecting element:**

This subclass is indented under subclass 153. Subject matter having an element which reflects the sound waves.

**161 With mechanical amplifier arrangement:**

This subclass is indented under subclass 150. Subject matter having a vibrating solid element intermediate a conversion between mechani-

- cally increases the amplitude of the vibrations of the solid.
- 162 Detail of mechanical vibration coupling to transducer (e.g., tuned vibrating element):**  
This subclass is indented under subclass 150. Subject matter including a detail of a mechanical element which transfers sound vibrations to or from the audio transducer.
- 163 Having bi-directional transducer:**  
This subclass is indented under subclass 150. Subject matter having a single device which converts sound waves to electrical variations and electrical variations to sound waves.
- (1) Note. For classification herein, conversion in both directions must be specifically included.
- SEE OR SEARCH CLASS:  
379, Telephonic Communications, subclass 420 for a loudspeaking type telephone set with a single bi-directional transducer; subclass 433 for a handset having a single bi-directional transducer.
- 164 Thermal response to, or generation of, sound vibration:**  
This subclass is indented under subclass 150. Subject matter where sound waves either modify or are emitted by a temperature effect on an element material, or area of the device.
- 165 By modifying fluid flow:**  
This subclass is indented under subclass 150. Subject matter having a source of gas flow which flow interacts with an electrical circuit to either (a) vary the current therein in accordance with incident sound waves, or (b) produce sound waves corresponding to an applied audio information signal in the electric circuit.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
166, for similar subject matter having a fluid electrical conducting element absent fluid flow.
- 166 Having fluid as a conducting element:**  
This subclass is indented under subclass 150. Subject matter wherein an electrically conductive element of the transducer is a fluid.
- (1) Note. The fluid conducting element may be either the portion converting the signal between electrical variations and sound waves, or an electrode connecting the circuit to another transducer.
- (2) Note. The fluid may include an ionized path between electrodes.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
165, for a fluid flow modifying transducer.
- 167 Ionized gap, spark, or flame:**  
This subclass is indented under subclass 166. Subject matter which ionizes the air or other gas or causes sparks across a gap.
- (1) Note. Included herein are also plasma, glow discharge, or flame.
- 170 Compound:**  
This subclass is indented under subclass 168. Subject matter having a plurality of independent microphone devices in a single casing.
- 171 Micromagnetic:**  
This subclass is indented under subclass 168. Subject matter in which the incident sound vibrates a diaphragm so as to vary both the resistance of a microphone contact and magnetic induction means which reinforce each other to produce a combined affect on an electric current.
- 172 Light modifying:**  
This subclass is indented under subclass 168. Subject matter for converting an incident sound wave to an audio signal by means of a light modifying element.
- SEE OR SEARCH CLASS:  
455, Telecommunications, subclasses 618+ for a transmitter for light wave communication.
- 173 Piezoelectric or ferroelectric:**  
This subclass is indented under subclass 168. Subject matter having an element made of either (a) a material which produces a voltage when subjected to a mechanical stress or (b) a material having a spontaneous electrical polarization.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
190, and 191, for reproducer or generic transducer of the piezoelectric or ferroelectric type, respectively.
- 174 Capacitive:**  
This subclass is indented under subclass 168. Subject matter having an electrostatic capacitance element which varies in accordance with sound waves incident thereon.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 283.1+ for pressure responsive electrostatic capacitors, per se.
- 175 Semiconductor junction microphone:**  
This subclass is indented under subclass 168. Subject matter having an element with conductivity intermediate that of a conductor and an insulator and having one region having predominantly electron conductivity (n-type) and another region having predominantly hole (p-type) conductivity forming a potential barrier layer therebetween.
- SEE OR SEARCH CLASS:  
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 53+, 108, 225+, and 414+ for nonelectrical input devices, including subclasses 415+ for pressure sensors.
- 176 Conductive diaphragm (e.g., reed, ribbon):**  
This subclass is indented under subclass 168. Subject matter having an electrically conductive element as a portion of the diaphragm.
- 177 Dynamic (e.g., magnetic):**  
This subclass is indented under subclass 168. Subject matter including a diaphragm to which a current conducting element is attached and which is positioned in a fixed magnetic field.
- 178 Vibrating electrical contact:**  
This subclass is indented under subclass 168. Subject matter in which two elements have an area of intermittent electrical contact caused by oscillatory motion of an element in accordance with incident sound waves.
- 179 Resistive:**  
This subclass is indented under subclass 168. Subject matter having an element the resistance of which is varied by incident sound waves.
- SEE OR SEARCH CLASS:  
338, Electrical Resistors, appropriate subclasses for a condition responsive variable resistor.
- 180 Granular or carbon:**  
This subclass is indented under subclass 180. Subject matter having a sound responsive resistive element composed of either elemental carbon, or a mass of comminuted material.
- 181 Differential:**  
This subclass is indented under subclass 180. Subject matter having two sound responsive resistance elements one positioned on either side of a central diaphragm.
- 182 Plural or compound reproducers:**  
This subclass is indented under subclass 180. Subject matter having a plurality of sound producing transducer having two or more elements performing the same or similar functions.
- 184 Different types of diaphragms:**  
This subclass is indented under subclass 182. Subject matter having two or more flexible membranes which differ in size, shape or composition.
- 185 Having common voice coil:**  
This subclass is indented under subclass 182. Subject matter where two or more flexible membranes are driven by a common helix of conductive material carrying an electrical information signal.
- 186 Plural diaphragms:**  
This subclass is indented under subclass 182. Subject matter including a speaker having plural flexible membranes, for radiating sound waves.
- 189 Having protective or shielding feature:**  
This subclass is indented under subclass 150. Subject matter having structure for shielding a transducer from adverse environmental conditions or preventing undesired effects caused by an external magnetic field.

- (1) Note. Adverse conditions include moisture and impact.

**190 Electrostrictive, magnetostrictive, or piezoelectric:**

This subclass is indented under subclass 150. Subject matter including an element which expands or contracts in accordance with an applied electric or magnetic field, or which produces a mechanical stress tending to produce deflection, expansion, or contraction when subjected to an applied electrical voltage.

- (1) Note. The term deflection covers both twisting and bending.

SEE OR SEARCH THIS CLASS, SUBCLASS:

173, for a piezoelectric microphone.

**191 Having electrostatic element (e.g., electret, vibrating plate):**

This subclass is indented under subclass 150. Subject matter including either a capacitor with a vibratable plate, or an element which has a spontaneous electrical field, one of which is caused to vibrate by an audio signal or incident sound.

SEE OR SEARCH THIS CLASS, SUBCLASS:

174, for a capacitive microphone.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclass 400 for electrets.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclass 516 for miscellaneous vibration sensitive circuits.

361, Electricity: Electrical Systems and Devices, subclasses 283.1+ for a pressure responsive capacitor, per se.

**300 Stereo speaker arrangement:**

This subclass is indented under subclass 1. Subject matter including transducers for reproducing the sound signals, and the spatial relationship of the transducers to their surroundings.

**301 In furniture or clothing:**

This subclass is indented under subclass 300. Subject matter in which the transducers are mounted on or within a pillow, headrest, couch, jacket, belt, etc.

- (1) Note. A television set, computer monitor, etc. is considered to be an "image presentation means," and is not considered to be "furniture" for this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

306, for image projection means, i.e., a television set having stereo speakers.

333, for furniture, clothing, or image projection means combined with a monaural loudspeaker.

364, for clothing combined with a microphone.

388, for furniture or clothing combined with mounting or support feature of housed loudspeaker.

**302 In vehicle:**

This subclass is indented under subclass 300. Subject matter in which the transducers are mounted on or within an automobile, aircraft, motorcycle, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

365, for a housed microphone mounting or support in a vehicle.

389, for a mounting or support feature of a housed loudspeaker in a vehicle.

**303 Optimization:**

This subclass is indented under subclass 300. Subject matter in which steps are taken to enhance the stereo listening effect, such as by enlarging the area in which stereo audibility is satisfactory (i.e., the "sweet point").

**304 Enclosure orientation:**

This subclass is indented under subclass 303. Subject matter in which either a distance or relative angle between two or more transducer housings or baffles is adjusted or specified.

**305 Enclosure adaptation:**

This subclass is indented under subclass 303. Subject matter in which a modification is made within single housing or baffle, such as by providing a directible or directional capability.

**306 With image presentation means:**

This subclass is indented under subclass 300. Subject matter in which the transducers are arranged to emit sound in conjunction with a television screen, computer monitor, motion picture screen, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

333, for image presentation means combined with a loudspeaker.

388, for image presentation means combined with a mounting or support feature of a housed loudspeaker.

SEE OR SEARCH CLASS:

353, Optics: Image Projectors, subclasses 15+ for sound accompaniment with an image projector.

359, Optics: Systems and Elements, subclass 444 for a projection screen with a sound producer.

**307 Surround (i.e., front plus rear or side):**

This subclass is indented under subclass 300. Subject matter in which, in addition to having at least one transducer arranged forward of a listening position, at least one transducer is arranged laterally or to the back of the listening position.

**308 In single baffle:**

This subclass is indented under subclass 300. Subject matter in which the two or more spatially related sounds are emitted from a only one transducer enclosure.

**309 Stereo earphone:**

This subclass is indented under subclass 300. Subject matter in which the transducers are intended to be placed in or over the user's ears.

**310 Virtual positioning:**

This subclass is indented under subclass 309. Subject matter in which audio signals, prior to delivery to the earphone, are processed in order to give an illusion that the spatially related

sounds are being emitted from physically distinct locations in the earphone user's environment.

- (1) Note. The orientation of earphones with respect to the room changes as the user moves his or her head. Virtual positioning when specifically used with an earphone is often done for the purpose of making the sounds appear to come from an invariant physical location in the environment, irrespective of the orientation of the user's head. This is done to foster the illusion that the user is not in fact wearing headphones.

SEE OR SEARCH THIS CLASS, SUBCLASS:

17, for a device or arrangement which transforms single channel audio signals into a plurality of channels of audio information to create a sense of depth. Comprehended in subclass 17 is virtual positioning, typically used with loudspeakers.

**311 Wireless or for use in diverse environment:**

This subclass is indented under subclass 309. Subject matter in which a) audio signals are conveyed to the earphone without the use of conductors, such as by modulated RF or infrared carrier wave or b) the earphone is especially configured or adapted to be used in an unusual location, such as underwater or within a magnetic field such as Magnetic Resonance Imaging (MRI), etc.

SEE OR SEARCH CLASS:

398, Optical Communications, various subclasses for modulated wireless optical communications.

455, Telecommunications, for modulated wireless communications, generally.

**312 HEARING AIDS, ELECTRICAL:**

This subclass is indented under the class definition. Subject matter having a small ambient sound reproducing system wherein an output transducer transmits directly into the ear or skull for use by the hard of hearing to increase the sound level received by the ear (i.e., listening assistance).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 23.1, for hearing aids in binaural and stereophonic circuits and systems.
- 60, for testing of hearing aids.
- 74, for headphone circuits.
- 75, for megaphones.
- 327, for hearing aids within the scope of this definition in combination with spectacle structure such as temples.
- 370, for a headphone.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclass 585 for ear or hearing testing, and subclasses 645+ for measuring acoustic parameters.
- 128, Surgery, subclass 746, for testing by auditory stimulus (e.g., audiology)
- 181, Acoustics, subclasses 126+ for mechanical hearing aids.
- 330, Amplifiers, particularly subclass 65 and 250+ for amplifiers involving structural details or elements, and transistor amplifiers.
- 351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 41+ for spectacles and eyeglasses, and subclasses 111+ for spectacle temples.
- 600, Surgery, subclass 25 for a surgically implanted vibratory hearing aid.
- 623, Prosthesis (i.e., Artificial Body Members), Parts Thereof or Aids and Accessories Therefor, subclass 10 for artificial ears having electrical hearing aid as a subcombination.

**313 Directional:**

This subclass is indented under subclass 312. Subject matter where a response of an input transducer (i.e., microphone) to the ambient sound varies significantly with a location of a source relative to the transducer, the hearing aid, or the hearing aid user.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 356+, for a directional microphone.

**314 Programming interface circuitry:**

This subclass is indented under subclass 312. Subject matter including circuitry within the hearing aid or external to the hearing aid for

connection to the hearing aid in order to program it.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 323, for programming interface terminals in a hearing aid, without circuitry,

**315 Remote control, wireless, or alarm:**

This subclass is indented under subclass 312. Subject matter allowing for a) parameters of the hearing aid to be altered from a location different from the location of the hearing aid itself, b) processed sound from an amplifier to be conveyed to the ear without the use of conductors or an acoustic tube, or c) a warning sensor or device to make its warning known to a hearing aid user through the hearing aid.

SEE OR SEARCH CLASS:

- 340, Communications: Electrical, subclasses 12.22, 12.3, and 12.5-12.53 for pulse responsive wireless remote control, subclasses 13.24-13.3 for frequency responsive wireless remote control, and subclasses 635 through 656 for alarms responding to condition changes in electrical apparatus.

**316 Frequency transposition:**

This subclass is indented under subclass 312. Subject matter in which some portion of a received audio signal is shifted in frequency prior to being delivered to the hearing aid's loudspeaker in order to enhance audibility.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 320, for spectral control in the hearing aid

**317 Noise compensation circuit:**

This subclass is indented under subclass 312. Subject matter including circuitry to ameliorate effects of undesired signals.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 94, for a device of this class including means for noise suppression.
- 322+, for subject matter in which amelioration of noise is accomplished using purely mechanical or acoustic means.

## SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits and Systems, subclasses 551+ for unwanted signal suppression generally.

**318 Feedback suppression:**

This subclass is indented under subclass 317. Subject matter in which the particular kind of undesired signal is howling or screeching caused by a return to the hearing aid's input of a sufficient fraction of its output to cause oscillation.

(1) Note. Hearing aid feedback normally occurs via an acoustic path.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

83, for feedback suppression circuitry in a public address system.

93, for generic feedback circuitry under the class definition.

**319 With vacuum tube amplifier:**

This subclass is indented under subclass 312. Subject matter including means using one or more devices in which electron flow takes place in an evacuated envelope.

## SEE OR SEARCH CLASS:

330, Amplifiers, subclass 64 for vacuum tube amplifiers generally.

**320 Spectral control:**

This subclass is indented under subclass 312. Subject matter including a circuit to control the amplitude of a received audio signal in at least two separate frequency bands, i.e., to selectively amplify or attenuate two or more different frequencies or frequency bands.

(1) Note. Included herein are tone control and filtering. Note that subject matter which emphasizes one frequency band relative to another inherently results in different treatment of two bands, and is properly classified here.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

316, for frequency transposition in hearing aids.

**321 Wideband gain control:**

This subclass is indented under subclass 312. Subject matter having a circuit to regulate the amplitude of the entire frequency range of a received audio signal (i.e., broad band amplitude regulation).

(1) Note. The amount of amplification may be adjusted either manually or in response to a sound parameter, as in automatic gain or volume control (AGC, AVC).

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

104+, for amplitude or volume control of an audio system.

## SEE OR SEARCH CLASS:

330, Amplifiers, subclasses 278+ for gain control means using a transistor.

**322 Specified casing or housing:**

This subclass is indented under subclass 312. Subject matter including a specific container for the hearing aid components.

**323 Power supply or programming interface terminals:**

This subclass is indented under subclass 322. Subject matter including a) an energy source such as a battery, solar cell, etc., or structural detail to accommodate an energy source, such as battery compartment detail, including contacts or b) contacts used for programming the hearing aid when hooked up to an interface.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

314, for programming interface *circuitry*.

## SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, for power supply or regulation systems generally.

**324 Component mounting:**

This subclass is indented under subclass 322. Subject matter including structural features designed for mounting or holding hearing aid parts and circuitry, including printed circuit boards.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
87+, for component mounting of this class wherein no electrical feature, is claimed.
- 325 Cerumen protection:**  
This subclass is indented under subclass 322. Subject matter having a barrier or means to prevent the hearing aid from being harmed by earwax.
- 326 Non-air-conducted sound delivery:**  
This subclass is indented under subclass 322. Subject matter in which sound is conducted to the inner ear through the cranial bones, the skin, or the nerves (i.e., bone conduction, tactile, transdermal, transcutaneous, etc.).
- (1) Note. The nerves may be stimulated without direct contact therewith. While surgically implanted devices, such as cochlear implants (Class 600, subclass 25), stimulate the nerves through direct contact therewith, other devices stimulate the nerves indirectly with modulated electromagnetic fields. The latter type of device is properly classifiable here.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
151, for a bone conduction audio transducer of this class, generally.
- 327 Spectacle:**  
This subclass is indented under subclass 322. Subject matter in combination with an eyeglass frame.
- SEE OR SEARCH CLASS:  
351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 41+ for spectacle and eyeglasses, and subclasses 111+ for spectacle temples.  
600, Surgery, subclass 25 for surgically implanted hearing aids, such as cochlear implants, which stimulate the nerves through direct contact therewith.
- 328 Ear insert:**  
This subclass is indented under subclass 322. Subject matter which fits entirely within and is completely supported by the user's ear.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
380, for a sound reproducer element inserted in the ear.
- SEE OR SEARCH CLASS:  
623, Prosthesis (i.e., Artificial Body Members) Parts Thereof or Aids and Accessories Therefor, subclass 10 for an artificial ear having an electrical hearing aid as a subcombination.
- 329 Device for manipulation:**  
This subclass is indented under subclass 328. Subject matter including means for insertion, extraction, or parameter setting of an ear insert.
- 330 Hook over ear:**  
This subclass is indented under subclass 322. Subject matter including support structure which engages an exterior portion of the user's ear.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
381, for a hook over ear type headphone including a particular support structure.
- 331 Inductive pickup:**  
This subclass is indented under subclass 322. Subject matter including an inductor or coil connected to the hearing aid in order to detect an electromagnetic field from a telephone ear piece.
- SEE OR SEARCH CLASS:  
379, Telephonic Communications, subclass 52, for a telephone system including an aid for a handicapped user, such as a hearing aid; search subclass 55 for a telephonic device having a near field link (i.e., capacitive or inductive).

- 332 And loudspeaker:**  
This subclass is indented under subclass 87. Subject matter where the specific container holds a transducer for converting an electrical signal into sound, e.g., a transducer baffle or housing.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
386, for a mounting or support feature of a housed loudspeaker wherein significant electrical features are not included.
- 333 With furniture, clothing, or image presentation means:**  
This subclass is indented under subclass 332. Subject matter in which an enclosure is part of, on, or within a) a couch, chair, headrest, etc., or b) a jacket, belt, etc., or c) a television set, computer monitor screen, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
301, for furniture or clothing in a stereo speaker arrangement.  
306, for image presentation means in a stereo speaker arrangement.  
388, for furniture, clothing, or image display in a mounting or support feature of a housed loudspeaker.
- 334 Portable or for use in diverse environment:**  
This subclass is indented under subclass 332. Subject matter in which an enclosure is a) readily movable from one location to another, or b) adapted for use in an unusual location such as underwater, within a magnetic field, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
311, for a stereo earphone that is wireless or for use in a diverse environment.
- 335 Plural diaphragms, compartments, or housings:**  
This subclass is indented under subclass 332. Subject matter in which there is a) more than one movable membrane within an enclosure, or b) an enclosure having more than one distinct volume, or c) more than one enclosure.
- 336 Curved or angled housing:**  
This subclass is indented under subclass 332. Subject matter in which an enclosure or some part of it (such as a reflex vent pipe) is non-linear, non-planar or constructed with faces which intersect at non-perpendicular angles.
- 337 Having acoustic wave modifying structure:**  
This subclass is indented under subclass 150. Subject matter having a passive element for changing a characteristic of audible sound vibrations produced or detected by an electro-acoustic transducer.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
370, for acoustic wave modifying structures in combination with headphones.
- SEE OR SEARCH CLASS:  
181, Acoustics, subclasses 175+ for sound-modifying means in a mechanical acoustic device or system.
- 338 With tubular waveguide or resonant element:**  
This subclass is indented under subclass 337. Subject matter for conducting sound through either a) a hollow cylinder or b) one or more hollow, acoustically resonant means, such as a hollow reed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
382, for sound conducting tube in a particular support structure.
- SEE OR SEARCH CLASS:  
181, Acoustics, subclasses 196+ for a mechanical acoustic sound modifying means within tubular means.
- 339 Sound intensifying or spreading element:**  
This subclass is indented under subclass 337. Subject matter wherein a) the amplitude of a sound wave is increased, or b) wherein the sound from the transducer is widely dispersed.
- 340 Horn:**  
This subclass is indented under subclass 339. Subject matter in which the intensifying element is a tubular element having a cross-

tional area which varies along the element's length.

**SEE OR SEARCH CLASS:**

181, Acoustics, subclasses 177+ for mechanical acoustic, intensifying horn.

**341 Inverted, folded, or curled:**

This subclass is indented under subclass 340. Subject matter in which a) a cross-sectional area of the sound conducting element decreases as a distance from a diaphragm increases, or b) the sound path of the element has one or more sharp bends, or c) an entrance of the element is smoothly curved back toward an exit.

**SEE OR SEARCH CLASS:**

181, Acoustics, subclass 194 for mechanical acoustic, intensifying horn having a doubly folded sound path.

**342 Plural horns or diaphragms:**

This subclass is indented under subclass 340. Subject matter in which there are either a) two or more tubular elements with varying cross-sectional areas, b) or a single tubular element with varying cross-sectional area which is fed from two or more vibrating membranes.

**343 Phase plug:**

This subclass is indented under subclass 340. Subject matter having an element placed within the throat of the horn to optimize the sound propagation.

(1) Note. A phase plug is usually placed in the throat adjacent the diaphragm.

**344 Mouthpiece:**

This subclass is indented under subclass 339. Subject matter wherein the modifying element is designed for use close to the mouth of a person speaking into a microphone.

**345 Acoustic enclosure:**

This subclass is indented under subclass 337. Subject matter including a housing surrounding the electro-acoustic transducer wherein the housing is specifically configured to modify characteristics of sound emitted or received by the transducer.

(1) Note. Electrical circuitry means amplifiers, filters, etc.; terminals, leads, and so forth are not considered to be significant electrical circuitry in this context.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

332+, for the combination of a loudspeaker in a housing is claimed with significant electrical circuitry.

386+, for the combination of a loudspeaker in a housing in which details other than acoustic properties are claimed.

**SEE OR SEARCH CLASS:**

181, Acoustics, subclasses 198+, for housing or enclosure for a mechanical acoustic sound modifying means.

**346 Acoustic resistance:**

This subclass is indented under subclass 345. Subject matter further including a material such as foam, wool, fiberglass, etc. or other sound absorbing means.

**SEE OR SEARCH CLASS:**

181, Acoustics, subclasses 284+ for sound absorbing panels in sound modifying means.

**347 On front side of diaphragm:**

This subclass is indented under subclass 346. Subject matter in which an acoustic resistance is placed within a primary sound radiation path of a vibrating membrane of a transducer.

**348 On rear side of diaphragm:**

This subclass is indented under subclass 346. Subject matter in which an acoustic resistance is placed within a non-primary sound radiation path of a vibrating membrane of a transducer.

**349 Bass reflex (e.g., rear wave):**

This subclass is indented under subclass 345. Subject matter in which a non-primary sound radiation path from the transducer's diaphragm is vented to ambient through the housing or cavity.

(1) Note. The length of the rear wave sound propagation path of a bass reflex enclosure is generally designed so that the rear wave is in phase with the front wave

when the two meet in the ambient atmosphere.

**350 Front wave:**

This subclass is indented under subclass 345. Subject matter in which a primary sound radiation path from a transducer's diaphragm is vented to ambient through the housing or cavity.

**351 Plural chambers:**

This subclass is indented under subclass 345. Subject matter wherein there is more than one physically distinct compartment space within the housing.

**352 Having internal wave reflecting means:**

This subclass is indented under subclass 345. Subject matter wherein the cavity or housing contains means to redirect a direction of travel of a sound wave.

**353 Acoustic damping or attenuating resonator:**

This subclass is indented under subclass 345. Subject matter in which a) the acoustic properties of a cavity are used to compensate for mechanical shock, i.e., to effectively cancel transmission of the shock to the transducer's output, or b) the resonant property of a cavity is used to absorb or attenuate sound at a particular frequency or over a band of frequencies.

- (1) Note. A 'quarter wave' Helmholtz resonator is a typical example of the subject matter included under definition (b) above.

**354 Absorbing or attenuating element:**

This subclass is indented under subclass 337. Subject matter wherein undesired sound intensity or vibration is lessened.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 355, for housed microphone.  
372, for mechanical or acoustic sound attenuation in combination with headphones.  
375, for a microphone in a particular support structure, wherein there is no claimed electrical feature of the transducer, but there is an electrical feature of the support.

SEE OR SEARCH CLASS:

- 181, Acoustics, subclasses 284+ for sound-absorbing means in a mechanical acoustic device or system.

**355 Housed microphone:**

This subclass is indented under subclass 150. Subject matter having either a capsule supported within an enclosure, or a diaphragm and motor means supported relative to one another in order to convert sound waves into a varying electrical voltage, further including structure beyond that necessary to merely support the diaphragm and motor means relative to one another.

- (1) Note. A microphone capsule is generally housed within a larger, unitary structure to provide protection, electrical connections, adequate size to be handled, acoustic properties, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 91, for a microphone in a mounting wherein there is no claimed electrical feature.  
111+, for circuitry combined with a specific type of microphone.  
122, for a microphone combined with an element having a diverse function, e.g., an amplifier.  
369, for a microphone capsule, per se.  
375, for a microphone in a particular support structure, wherein there is no claimed electrical feature of the transducer, but there is an electrical feature of the support.

**356 Directional:**

This subclass is indented under subclass 355. Subject matter acoustically or mechanically configured to have a different response to sounds emanating from different locations in an environment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 92, for a circuit for imparting directional pickup characteristics to a microphone.  
313, for directional hearing aids.

- 357 With plural sound ports (e.g., pressure gradient):**  
This subclass is indented under subclass 356. Subject matter having two or more openings within the housing for the purpose of providing multiple sound paths leading to a transducer.
- 358 Plural or variable characteristics:**  
This subclass is indented under subclass 357. Subject matter having a) two or more switchable discrete directional response patterns, or b) a single response pattern which is continuously variable.
- 359 Windscreen:**  
This subclass is indented under subclass 355. Subject matter including structure to ameliorate the effects of rapidly moving air or breath on a microphone.
- 360 Cavity:**  
This subclass is indented under subclass 355. Subject matter including a resonant acoustic space or similar structure designed to affect the acoustic characteristics of a microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
345, for acoustic enclosure in acoustic wave modifying structure.
- 361 Mounting or support:**  
This subclass is indented under subclass 355. Subject matter having a) details of how a microphone capsule is supported within a housing, or b) a structure designed to hold a housed microphone for or during use.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
91, for microphone in support or housing.
- 362 Boom (other than on headset):**  
This subclass is indented under subclass 361. Subject matter including a generally horizontally projecting beam, pole, rod, or spar which supports a microphone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
363, for a stand or goose neck in a mounting or support.  
367, for a headgear in mounting or support.
- 375, for a microphone in particular support structure.
- 390, for a boom or support arm in a mounting or support feature of a housed loudspeaker.
- 363 Stand or gooseneck:**  
This subclass is indented under subclass 361. Subject matter in which the microphone is supported a) at the end of a beam, pole, rod, or spar which has a generally upright position, or b) on one end of a flexible, tube-like structure which will generally retain a certain shape or position when adjusted.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
362, for a boom (other than on headset) in mounting or support of housed microphone.
- 364 On body or clothing:**  
This subclass is indented under subclass 361. Subject matter in which the mounting or support secures the microphone to a human being's person or garments.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
367, for a microphone in headgear.
- 365 In electronic apparatus or vehicle:**  
This subclass is indented under subclass 361. Subject matter in which the mounting or support means secures the microphone a) to a walkie-talkie, video camera, transceiver, etc., or b) to or in an automobile, aircraft, motorcycle, etc.
- 366 Detachable from support:**  
This subclass is indented under subclass 361. Subject matter in which the microphone is designed to be readily removed from its support.
- 367 In headgear:**  
This subclass is indented under subclass 361. Subject matter wherein the microphone is mounted or supported in or on a helmet or breathing mask or similar structure.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
364, for microphone attached to a person's body or clothing.
- 368 On shock absorbing support:**  
This subclass is indented under subclass 361. Subject matter in which the mounting means is particularly adapted to lessen the effects of mechanically coupled vibration to the microphone.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
353, for an acoustic damping or attenuating resonator in an acoustic enclosure.
- 369 Microphone capsule only:**  
This subclass is indented under subclass 150. Subject matter for converting a sound wave into a corresponding time variation of an electrical signal, in which the claimed subject matter consists essentially of a diaphragm and motor means to convert sound-induced movement of the diaphragm into an electrical signal, and any minimal chassis or housing components necessary to hold the diaphragm and motor means together or in proper relative position.
- (1) Note. This basic combination is sometimes referred to as a 'capsule', or a 'cartridge', or a 'button'. This is essentially the 'smallest' combination of elements which can be said to comprise a transducer.
- 370 Headphone:**  
This subclass is indented under subclass 182. Subject matter including a head-engaging element which holds a transducer for reproducing sound signal, against an ear of a user.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
74, for headphone circuits.
- 371 Particular cup:**  
This subclass is indented under subclass 370. Subject matter having particular structural features relating to enclosures designed to fit over or on a user's ear.
- 372 Having mechanical or acoustic sound attenuation:**  
This subclass is indented under subclass 371. Subject matter in which the particular feature of a cup is designed to reduce noise.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
354, for an absorbing or attenuating element in acoustic wave modifying structure.
- 373 Openable to ambient:**  
This subclass is indented under subclass 371. Subject matter in which the space within the cup is ventable to the atmosphere.
- 374 Particular support structure:**  
This subclass is indented under subclass 370. Subject matter having a specific means for maintaining a transducer on the user's head.
- 375 And microphone:**  
This subclass is indented under subclass 374. Subject matter in combination with a means for converting sound waves into a varying electrical current or voltage.
- (1) Note. A typical example is a microphone supported from the headphone by a boom, often found on telephone operator's headsets.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
355, for a housed microphone.  
362, for a microphone on a boom.  
369, for a microphone capsule.
- 376 Headgear:**  
This subclass is indented under subclass 374. Subject matter in which the support structure is a helmet, hat, breathing mask, or similar structure.
- 377 Plural bands:**  
This subclass is indented under subclass 374. Subject matter having two or more belts or straps.
- 378 Single band:**  
This subclass is indented under subclass 374. Subject matter including one belt or strap.

**379 Adjustable:**

This subclass is indented under subclass 374. Subject matter in which some characteristic of a support structure may be altered in length or size to ensure a proper fit of a transducer to the user's head.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

383, for a collapsible feature in particular support structure.

**380 Ear insert or bone conduction:**

This subclass is indented under subclass 374. Subject matter which a) fits entirely within a user's ear or is completely supported within the outer auditory meatus of a user's ear, or b) is designed to transmit sound to a user's inner ear by vibration of a user's skeletal structure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

326, for a hearing aid that uses a non-air-conducted sound delivery to inner ear in a specified casing or housing.

328, for a hearing aid comprising an ear insert in a specified casing or housing.

**381 Hook over ear or spectacle:**

This subclass is indented under subclass 374. Subject matter including support structure which a) engage's the exterior of the user's ear, e.g., the pinna, or b) in which the support structure is an eyeglass frame.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

327, for a hearing aid mounted in a spectacle.

330, for hook over ear type hearing aid in a specified casing or housing.

**382 Sound conducting tube:**

This subclass is indented under subclass 374. Subject matter in which the support structure comprises a hollow cylindrical element acoustically connecting two earcups.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

338, for a tubular waveguide or resonant element in acoustic wave modifying structure.

**383 Collapsible:**

This subclass is indented under subclass 374. Subject matter in which the support structure can be reduced in size for ease of carrying through folding or bending.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

379, for adjustable feature in particular support structure.

**384 Electrical hardware feature:**

This subclass is indented under subclass 370. Subject matter with particular connections or connectors, such as jack, plug, terminals, cord details, etc.

(1) Note. Headphones in combination with electrical circuitry such as amplifiers, filters, and so on are generally classified elsewhere.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

74, for headphone circuits.

309+, for stereo earphones with circuitry.

394, for electrical hardware in mounting or support feature of housed loudspeaker.

**385 Having body supported structure other than on head:**

This subclass is indented under subclass 150. Subject matter having a means to support a transducer on the neck, shoulders, chest, abdomen, arms, hands, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

376, for a headgear for supporting a headphone.

**386 Mounting or support feature of housed loudspeaker:**

This subclass is indented under subclass 150. Subject matter having a) a transducer for converting a time varying electrical signal into sound combined with an enclosure, casing, shell, or baffle, or b) details of the fastening of such a transducer to or within an enclosure, casing, shell, or baffle, or c) means to hold an enclosed transducer for or during use.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 87, for a device of this class having electrical features in addition to mounting features.  
 332+, for loudspeaker in an enclosure or housing wherein electrical features are also claimed.
- 387 Directional, directible, or movable:**  
 This subclass is indented under subclass 386. Subject matter in which a) the housing and transducer together radiate sound with different strengths toward different locations in an environment, or b) the enclosure or a portion thereof is aimable or steerable toward different locations in an environment, or c) means are provided to enable a housed transducer to be readily relocated to different positions in an environment.
- 388 With furniture, clothing, or image display:**  
 This subclass is indented under subclass 386. Subject matter wherein the particular support or mounting feature of the transducer involves furniture such things as a headrest, couch, chair, jacket, hat, belt, harness, etc., or a television, computer monitor, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 301, for stereo speakers mounted in furniture or clothing.  
 306, for stereo speakers arranged to emit sound in conjunction with an image presentation means.  
 333, for a loudspeaker mounted in furniture, clothing, or image presentation means, wherein no electrical feature is claimed.
- 389 In vehicle:**  
 This subclass is indented under subclass 386. Subject matter wherein the support or mounting is in an automobile, aircraft, motorcycle, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 365, for mounting or support means securing a microphone in a vehicle or electronic apparatus.
- 390 Boom or support arm:**  
 This subclass is indented under subclass 386. Subject matter including a) a generally horizontally projecting beam, pole, rod, or spar which maintains the position of a housed transducer for or during use, or b) a hand-held support comprising a beam, pole, rod, or spar.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 362, for boom used in mounting or support of a housed microphone.
- 391 Grille:**  
 This subclass is indented under subclass 386. Subject matter including a mesh or grating covering the transducer or a sound path leading to the transducer.
- 392 Resilient:**  
 This subclass is indented under subclass 386. Subject matter including a vibration or shock damping means, cushioning means, springs, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 346+, for acoustic damping of a transducer in an acoustic enclosure, as in an acoustic resistance (foam, wool, fiberglass, etc.) in an acoustic path.  
 353, for acoustic damping or attenuating in an acoustic enclosure.  
 354, for acoustic damping in combination with a transducer.
- 393 Electrical insulation feature:**  
 This subclass is indented under subclass 386. Subject matter in which the housing or components within it do not conduct electricity.
- SEE OR SEARCH CLASS:  
 174, Electricity: Conductors and Insulators, for insulators, generally.
- 394 Electrical hardware:**  
 This subclass is indented under subclass 386. Subject matter including circuit boards, terminals, terminal blocks, signal conductors (i.e., wires, leads, or cords), etc.
- (1) Note. Subject matter involving circuitry which filters, amplifies, etc., in combina-

tion with a loudspeaker in a housing is classified in this class, subclasses 332+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

332+, for subject matter involving circuitry which filters, amplifies, etc., in combination with loudspeaker in a housing.

384, for a headphone including an electrical hardware feature.

**395 Mechanical detail:**

This subclass is indented under subclass 386. Subject matter involving the details of how the support or mounting is achieved, such as using clips, screws, tabs, detents, bonding, etc.

SEE OR SEARCH CLASS:

411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Locked-Threaded Fastener, for mechanical mounting details, generally.

**396 Electromagnetic (e.g., dynamic):**

This subclass is indented under subclass 150. Subject matter wherein an information varied electrical signal produces a similarly varying magnetic field which causes motion in a sound radiating device to produce a corresponding acoustical wave.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

117, for circuitry combined with a magnetic loudspeaker.

SEE OR SEARCH CLASS:

335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, for electromagnetic circuits and devices, generally.

336, Inductor Devices, for inductor devices, generally.

**397 Cooling feature:**

This subclass is indented under subclass 396. Subject matter including a feature designed to remove heat from the transducer.

SEE OR SEARCH CLASS:

165, Heat Exchange, for heat exchange, generally.

361, Electricity: Electrical Systems and Devices, subclasses 688+ for cooling means in electronic systems and devices.

**398 Having diaphragm support feature:**

This subclass is indented under subclass 396. Subject matter having specific structure to maintain a sound radiating flexible membrane in a specified position relative to other parts of the transducer.

**399 Conductive diaphragm (e.g., ribbon):**

This subclass is indented under subclass 396. Subject matter in which at least a portion of a sound radiating membrane *itself* conducts the information varied electrical signal.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

176, for a microphone with a conductive diaphragm.

400, for a coil or other conductor path mounted directly on the diaphragm.

**400 Movable voice coil:**

This subclass is indented under subclass 396. Subject matter having a spiral shaped conductor attached to a flexible membrane and positioned in an air gap in a magnetic circuit, so as to drive the membrane in accordance with an applied current.

**401 Multiple voice coils:**

This subclass is indented under subclass 400. Subject matter in which there is more than one spirally wound conductor.

**402 For different frequencies:**

This subclass is indented under subclass 401. Subject matter in which at least two separate voice coils receive signal currents having distinct spectral content.

**403 Centering from outside bobbin or diaphragm:**

This subclass is indented under subclass 400. Subject matter for the adjustment of voice coil position in an air gap so that the coil and gap axes coincide, in which the means for accomplishing this lies outside a cylindrical means holding the voice coil, or outside the volume contained by a moving membrane.

- 404 Spider:**  
This subclass is indented under subclass 403. Subject matter including a concentrically-waved membrane or sheet which readily flexes in the direction of motion of the diaphragm, but resists motion perpendicular to the diaphragm's motion, and which typically surrounds the diaphragm or bobbin in an annular manner.
- 405 Centering from within bobbin or diaphragm:**  
This subclass is indented under subclass 400. Subject matter for adjustment of voice coil position in the air gap so that the coil and gap axes coincide in which the means for accomplishing this lies within the volume enclosed by a vibrating membrane, or within the volume enclosed by a cylindrical form on which the voice coil is wound.
- (1) Note. An example is a flexible disk attached to the inner side of the diaphragm with a number of flexible arms or leaves, with the center of the disk attached by screw to a center pole or stud.
- 406 Field coil:**  
This subclass is indented under subclass 400. Subject matter including a spirally wound conductor which receives a current designed to generate a static field against which the signal-related electromagnetic field of the voice coil will react to generate motion.
- (1) Note. A field coil generally substitutes for or augments a permanent magnet.
- 407 Particular bobbin structure:**  
This subclass is indented under subclass 400. Subject matter specifying particular details about a cylindrical form or member on which the voice coil is wound.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclasses 118+ for a winding bobbin or spool, generally.
- 408 Pattern:**  
This subclass is indented under subclass 400. Subject matter where the voice coil comprises a particular configuration of conductive material applied directly to the diaphragm.
- (1) Note. The diaphragm is usually flat.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
410, for coil structure in a cylindrically wound coil (e.g. on a bobbin ).
- 409 Wiring structure:**  
This subclass is indented under subclass 400. Subject matter specifying detail of the manner in which the signal conductors (i.e., voice coil) are mechanically or electrically attached, fastened, connected, etc.
- 410 Coil coating, winding layer structure, or wire:**  
This subclass is indented under subclass 400. Subject matter specifying details of a cylindrically wound voice coil (e.g., on bobbin), such as 1) insulation or wire covering, 2) manner in which wire is wound on bobbin, or 3) details of the conductor per se, such as crosssection (e.g., square, etc.) or wire material (copper, silver, etc.).
- SEE OR SEARCH CLASS:  
174, Electricity: Conductors and Insulators, for conductors.  
336, Inductor Devices, subclasses 222+ for winding an inductor device.
- 411 Including adjustment mechanism:**  
This subclass is indented under subclass 396. Subject matter including means to alter some aspect or physical parameter of the electromagnetic transducer, such as the air gap size.
- 412 Magnetic circuit:**  
This subclass is indented under subclass 396. Subject matter including a path of magnetic flux from north pole to south pole of a magnet (or electromagnet) through a magnetic material.

- 413 Having damping:**  
This subclass is indented under subclass 412. Subject matter including a sound or vibration absorbing means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
353, for acoustic damping or attenuating resonator in acoustic enclosure.  
354, for absorbing or attenuating element in acoustic enclosure.  
372, for mechanical or acoustic sound attenuation in headphone.
- 414 Flux modifying means:**  
This subclass is indented under subclass 412. Subject matter which shapes or alters the magnetic flux in the air gap in order to enhance its effectiveness in reacting with a voice coil or diaphragm.
- 415 Magnetic liquid:**  
This subclass is indented under subclass 412. Subject matter having a colloid containing magnetic particles in a region unoccupied by solid members of the magnetic circuit, such as the air gap.
- 416 Inverted (e.g., within cone):**  
This subclass is indented under subclass 412. Subject matter in which the elements of the magnetic circuit (e.g., magnets and pole pieces) lie substantially entirely within the volume enclosed by an axially extending, e.g., conical diaphragm.
- (1) Note. The diaphragm is usually conical, and thus the magnetic circuit lies within the cone, and the voice coil bobbin also projects toward the cone rather than away from the cone.
- 417 Armature diaphragm:**  
This subclass is indented under subclass 412. Subject matter in which the voice coil is stationary and a moving membrane itself is made of magnetic material and vibrates within the fluctuating electromagnetic field of the voice coil.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
419, for an electromagnetic transducer not having a central magnetic portion in the magnetic circuit.
- 418 Armature linked to diaphragm:**  
This subclass is indented under subclass 412. Subject matter in which a magnetic member separate from a moving membrane vibrates within a stationary voice coil's electromagnetic field and its motion is mechanically linked to the moving membrane.
- 419 Not having central magnetic portion:**  
This subclass is indented under subclass 412. Subject matter in which the magnetic circuit lacks an innermost magnet or pole piece.
- (1) Note. This configuration usually lacks a central annular air gap, and it is often associated with an armature diaphragm. Typical shapes include annular, horse-shoe, or U-shaped.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
417, for an armature diaphragm in a magnetic circuit.
- 420 Having central magnetic portion:**  
This subclass is indented under subclass 412. Subject matter in which there is an innermost magnet or pole piece around which other parts of the magnetic circuit are symmetrically located.
- (1) Note. This configuration is most often associated with the standard conically-shaped diaphragm with cylindrical bobbin and centrally located annular air gap.
- 421 Plural magnets:**  
This subclass is indented under subclass 420. Subject matter having more than one permanent magnet or one permanent magnet and an electromagnet generated by a field coil.
- 422 Like poles adjacent:**  
This subclass is indented under subclass 421. Subject matter in which respective regions of either north magnetic polarity or south magnetic polarity of two magnets are juxtaposed.

**423 Specified diaphragm shape or structure:**  
This subclass is indented under subclass 396. Subject matter including a flexible membrane with a particular geometrical contour or made of a specified material.

SEE OR SEARCH CLASS:

181, Acoustics, subclasses 167+ or 173+ for critically defined acoustic diaphragm structure or shape, generally.

**424 Plural portions or sections:**  
This subclass is indented under subclass 423. Subject matter specifying that a diaphragm has more than one distinct area with respect to construction or function.

**425 Honeycomb:**  
This subclass is indented under subclass 424. Subject matter in which the diaphragm is composed of two or more sheets or layers of material connected with a corrugated, web-like structure.

**426 Critically defined material or lamination:**  
This subclass is indented under subclass 423. Subject matter specifying the use of a particular substance or a layered structure.

**427 Metal**  
This subclass is indented under subclass 426. Subject matter in which the particular material is a metallic substance.

SEE OR SEARCH CLASS:

181, Acoustics, subclass 168 for metallic material in diaphragm in acoustic devices generally.

**428 Fibrous**  
This subclass is indented under subclass 426. Subject matter in which the particular material is comprised of slender, elongated structures, such as threads, filaments, etc.

(1) Note. Paper and cardboard are materials made from cellulose fibers.

SEE OR SEARCH CLASS:

181, Acoustics, subclass 169 for fibrous material in diaphragm in acoustic devices.

**429 Apertures in surface**  
This subclass is indented under subclass 423. Subject matter in which a diaphragm is perforated or has holes or openings therein.

**430 Dome or round**  
This subclass is indented under subclass 423. Subject matter in which a diaphragm has the shape of a hemisphere or a sphere, or a similarly curved surface.

**431 Flat:**  
This subclass is indented under subclass 423. Subject matter in which a diaphragm has a substantially planar surface.

**432 Conical:**  
This subclass is indented under subclass 423. Subject matter where a diaphragm has a configuration of at least a portion of a regular solid joining the circumference of a circle in a plane with a point along its axis of symmetry outside the plane.

(1) Note. This encompasses conical and frusto-conical shapes.

**433 Basket detail:**  
This subclass is indented under subclass 396. Subject matter specifying a frame-like structure which supports both a diaphragm and a magnetic circuit means.

#### FOREIGN ART COLLECTIONS

The definitions for FOR 100-FOR 122 below correspond to the definitions of the abolished subclasses under Class 381 from which these collections were formed. The definitions for FOR 123-FOR 124 below correspond to the definitions of the abolished subclasses under Class 381 from which these collections were formed. The definitions for FOR 125-FOR 139 below correspond to the definitions of the abolished subclasses under Class 381 from which these collections were formed. See the Foreign Art Collection schedule for specific correspondences. [Note: The titles and definitions for *indented* art collections include all the details of the one(s) that are hierarchically superior.]

#### FOR 100 AUDIO BANDWIDTH COMPRESSION OR EXPANSION:

Foreign art collection where there is either an expansion or reduction of the bandwidth

required for transmission of a sound signal using analog techniques or elements.

**FOR 101 With content reduction encoding:**

Foreign art collection where redundant information is discarded and replaced by a code indicating what has been discarded.

**FOR 102 Delay line:**

Foreign art collection having means to cause a time delay of a sound signal.

**FOR 103 TIME COMPRESSION OR EXPANSION (E.G., RUN LENGTH CODING):**

Foreign art collection where there is either an expansion or reduction of the time required for transmission of a sound signal using analog techniques or elements.

**FOR 104 With content reduction encoding:**

Foreign art collection where redundant information is discarded and replaced by a code indicating what has been discarded.

**FOR 105 SPEECH ANALYSIS AND SYNTHESIS COMBINED:**

Foreign art collection where signals representing the component parts of an input speech wave are generated and then the signals representing the component parts are used to produce a synthetic speech wave using analog techniques or elements.

**FOR 106 Using frequency:**

Foreign art collection where the signals represent the value of a function of a component frequency.

**FOR 107 Pitch:**

Foreign art collection where the signal represents the amplitude or frequency of the apparent predominant frequency of the speech wave.

**FOR 108 Formants:**

Foreign art collection where the signals represent the amplitude or frequency values of any of several resonance bands which determine the phonetic quality of a vowel sound.

**FOR 109 Using time:**

Foreign art collection where the signals represent the value of a function of time.

**FOR 110 SPEECH ANALYSIS (E.G., PHONEME RECOGNITION):**

Foreign art collection where an input speech signal is separated into its component parts using analog techniques or elements.

**FOR 111 Voice recognition:**

Foreign art collection which discriminates between different voices.

**FOR 112 Word recognition:**

Foreign art collection which discriminates between different sounds or words.

**FOR 113 Phonetic typewriters:**

Foreign art collection where the output is typescript.

**FOR 114 Frequency domain:**

Foreign art collection where the component parts are functions of frequency.

**FOR 115 Detection of speech in noise:**

Foreign art collection where an output is generated in response to the presence of a voice or speech signal input which may be obscured by noise.

**FOR 116 Signal to noise ratio enhancement:**

Foreign art collection where there is noise present along with the speech signal and the amplitude of the speech wave is increased relative to the amplitude of the noise.

**FOR 117 Speech parameter display:**

Foreign art collection where there is an output signal perceptible by the eye which represents one of the component parts of the input speech signal.

**FOR 118 Speech pitch fundamental frequency:**

Foreign art collection where the component part is the apparent predominant frequency of the input speech wave.

**FOR 119 Speech formant frequencies:**

Foreign art collection where the components parts are any of several resonance bands which determine the phonetic quality of a vowel sound.

**FOR 120 SPEECH SYNTHESIS:**

- Foreign art collection where the component parts of a speech signal are combined to produce a synthetic speech wave using analog techniques or elements.
- FOR 121 Speech from printed matter:**  
Foreign art collection where the synthetic speech wave is generated according to a written or printed text.
- FOR 122 Vocal tract model:**  
Foreign art collection having an analog of a human vocal tract.
- FOR 123 ACOUSTICAL NOISE OR SOUND CANCELLATION**  
Foreign art collections including subject matter where audible noise is at least partially eliminated by generating an out-of-phase replica of the offending sound.
- FOR 124 NOISE SUPPRESSION**  
Foreign art collections including subject matter with provision for reducing the effects of unwanted signals upon desired signals.
- FOR 125 Speaker arrangement:**  
Subject matter including transducers for reproducing the sound signals, and the spatial relationship of the transducers to their surroundings.
- FOR 126 Earphone:**  
Subject matter where the transducers are intended to be placed in or over the ear.
- FOR 127 HEARING AIDS, ELECTRICAL:**  
Subject matter under the class definition having a small ambient sound reproducing system wherein the output transducer transmits directly into the ear or skull for use by the hard of hearing to increase the sound level received by the ear (i.e., listening assistance).
- FOR 128 Directional:**  
Subject matter where the response of an input transducer (i.e., microphone to the ambient sound varies significantly with the direction of incidence of the sound.
- FOR 129 Frequency control:**
- Subject matter including a circuit to control the amplitude of the hearing aid as a function of the frequency.
- FOR 130 Bone conduction:**  
Subject matter in which sound is conducted to the inner ear through the cranial bones.
- FOR 131 Gain control:**  
Subject matter for varying the amount of amplification of the output signal.
- FOR 132 Spectacle:**  
Subject matter in combination with an eye-glass frame.
- FOR 133 Ear insert:**  
Subject matter which fits entirely within and is completely supported by the user's ear.
- FOR 134 Hook over ear:**  
Subject matter including support structure which engages the exterior of the user's ear.
- FOR 135 Specified casing or housing:**  
Subject matter including a specific container for the hearing aid components.
- FOR 136 Having vacuum tube amplifier:**  
Subject matter including an amplifier which uses one or more electron tubes.
- FOR 137 Having battery:**  
Subject matter including at least one battery used as a power source.
- FOR 138 Having enclosure or housing:**  
Subject matter where the mechanical adjunct or device is a specific container for electrical components.
- FOR 139 With loudspeaker (e.g., baffle, spatial orientation, etc.):**  
Subject matter where the specific container holds a loudspeaker.
- FOR 140 With acoustic wave modifying structure:**  
Subject matter having a passive element for changing a characteristic of audible sound vibrations produced or detected by an electro acoustic transducer.
- FOR 141 Including sound conducting tube:**

Subject matter including a tubular element through which sound is conducted.

**FOR 142 Directional:**

Subject matter wherein a characteristic of emitted or received sound is varied externally of the transducer in accordance with the direction of the sound path.

**FOR 143 Sound intensifying of spreading element (e.g., horn):**

Subject matter wherein the intensity of a sound wave is modified.

- (1) Note. The intensity is generally modified by an increase or decrease of cross-section are of the sound path.

**FOR 144 Mouthpiece:**

Subject matter wherein the modifying element is designed for use close to the mouth of a person speaking into a microphone.

**FOR 145 Absorbing or attenuating element (e.g., baffle, obstruction, damping):**

Subject matter wherein the sound intensity is lessened.

**FOR 146 Enclosure of resonant cavity:**

Subject matter wherein the acoustic structure includes either (a) a chamber having a particular resonant characteristic, or (b) a housing surrounding the electro acoustic transducer.

- (1) Note. Any housing or enclosure will modify acoustic energy incident upon or radiated from a transducer and this type of combination will be classified herein unless the enclosure is specifically recited as transparent to or not affecting, acoustic waves.

**FOR 147 Microphone:**

Subject matter for converting an audible sound wave into a corresponding time variation of an electrical signal.

- (1) Note. This and its indented subclasses specify sound to audio signal conversion. Generic audio transducers and signal to sound conversion (i.e., reproduction) are classified in subclasses 183 and the following subclasses.

**FOR 148 With mounting or support feature:**

Subject matter wherein a microphone is combined with positioning, placement, *or* holding structure.

**FOR 149 Headphone:**

Subject matter including a head engaging element which holds the transducer against the ears of a user.

**FOR 150 Having body supported structure (e.g., earphone):**

Subject matter including an element engaging either the body or clothing *of* the user and which supports and positions the transducer.

**FOR 151 With mounting or support feature:**

Subject matter combined with a positioning, placement, or holding structure.

**FOR 152 Electromagnetic (e.g. Dynamic):**

Subject matter wherein an information varied electrical signal produces a similarly varying magnetic field which causes motions a sound radiating device to produce a corresponding acoustical wave.

**FOR 153 Having feature of edge-supported diaphragm:**

Subject matter having structure for supporting a sound radiating flexible membrane along its periphery.

**FOR 154 Movable voice coil:**

Subject matter having a spiral shaped conductor attached to *a*. flexible membrane and positioned in an air gap in a magnetic circuit, so as to drive the membrane in accordance with an applied current.

**FOR 155 Multiple (e.g., double):**

Subject matter having more than one voice coil.

**FOR 156 Pattern:**

Subject matter where the voice coil comprise a particular configuration of conductive material applied directly to the diaphragm.

**FOR 157 Centering:**

Subject matter adjustment of voice coil position in the air gap so that the coil and air gap axes coincide.

**FOR 158 Including adjustment mechanism:**

Subject matter which varies a physical parameter of an electromagnetic transducer.

**FOR 159 Magnetic circuit or core structure:**

Subject matter including either a path of magnetic flux from north pole to south pole of a magnet or electromagnet through a magnetic material, or a detail of a magnetizable core element.

**FOR 160 Armature:**

Subject matter wherein the magnetic circuit includes a movable element.

**FOR 161 Magnet configuration (e.g., tubular or u-shaped):**

Subject matter including a magnet having a particular shape.

**FOR 162 Specified diaphragm-shape or structure:**

Subject matter including a flexible membrane with a specified shape or made of a specified material.

**FOR 163 Flat:**

Subject matter where the diaphragm has a substantially planar surface.

**FOR 164 Conical:**

Subject matter where the diaphragm has a configuration of at least a portion of a regular solid joining the circumference of a circle in a plane with a point along its axis of symmetry outside the plane.

- (1) Note. The term at least a portion- is intended to encompass both conical and frustra-conical configurations.

**FOR 165 Electro-acoustical transducer mounting or support:**

Subject matter including structure for positioning, placement, or holding a transducer.

END