

## SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

### F01 MACHINES OR ENGINES IN GENERAL; ENGINE PLANTS IN GENERAL; STEAM ENGINES

**F01N GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES** (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-air intake silencers specially adapted for, or arranged on, internal-combustion engines F02M 35/00; protecting against, or damping, noise in general G10K 11/16)

#### Note(s)

Attention is drawn to the Notes preceding class F01, especially as regards Note (3).

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| <b>1/00</b> | <b>Silencing apparatus characterised by method of silencing</b>  | 3/037 | • • by means of inertial or centrifugal separators, e.g. associated with agglomerators [7]   |
| 1/02        | • by using resonance   | 3/038 | • • by means of perforated plates defining expansion chambers associated with condensation and collection chambers [7]   |
| 1/04        | • • having sound-absorbing materials in resonance chambers   | 3/04  | • • by means of liquids  |
| 1/06        | • by using interference effect   | 3/05  | • • by means of air, e.g. by mixing exhaust with air (silencers working by addition of air to exhaust F01N 1/14; arrangements for the supply of additional air for the thermal or catalytic conversion of noxious components of exhaust F01N 3/30) [7] |
| 1/08        | • by reducing exhaust energy by throttling or whirling   | 3/06  | • for extinguishing sparks   |
| 1/10        | • • in combination with sound-absorbing materials  | 3/08  | • for rendering innocuous (using electric or electrostatic separators F01N 3/01; chemical aspects B01D 53/92) [1, 7]   |
| 1/12        | • • using spirally- or helically-shaped channels (F01N 1/10 takes precedence; cyclones B04C)   | 3/10  | • • by thermal or catalytic conversion of noxious components of exhaust [3]  |
| 1/14        | • by adding air to exhaust gases   | 3/18  | • • • characterised by methods of operation; Regulation [3]  |
| 1/16        | • by using movable parts   | 3/20  | • • • specially adapted for catalytic conversion (F01N 3/22 takes precedence) [3]  |
| 1/18        | • • having rotary movement   | 3/22  | • • • Regulation of additional air supply only, e.g. using by-passes or variable air pump drives [3]   |
| 1/20        | • • having oscillating or vibrating movement (the parts being resilient walls F01N 1/22)   | 3/24  | • • • characterised by constructional aspects of converting apparatus (filtering in combination with catalytic reactors F01N 3/035) [3, 7]   |
| 1/22        | • • the parts being resilient walls  | 3/26  | • • • Construction of thermal reactors [3]   |
| 1/24        | • by using sound-absorbing materials (F01N 1/04, F01N 1/06, F01N 1/10, F01N 1/14, F01N 1/16 take precedence)   | 3/28  | • • • Construction of catalytic reactors [3]   |
| <b>3/00</b> | <b>Exhaust or silencing apparatus having means for purifying, rendering innocuous, or otherwise treating exhaust</b> (electric control F01N 9/00; monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00) [4] | 3/30  | • • • Arrangements for supply of additional air (regulation, e.g. using by-passes or variable air pump drives, F01N 3/22) [3]  |
| 3/01        | • by means of electric or electrostatic separators [7]   | 3/32  | • • • using air pumps (using jet air pumps F01N 3/34; pumps in general F04) [3]  |
| 3/02        | • for cooling, or for removing solid constituents of, exhaust (by means of electric or electrostatic separators F01N 3/01) [1, 7]  | 3/34  | • • • using air conduits or jet air pumps, e.g. near the engine exhaust port [3]   |
| 3/021       | • • by means of filters [7]  | 3/36  | • • • Arrangements for supply of additional fuel [3]   |
| 3/022       | • • • characterised by specially adapted filtering structure, e.g. honeycomb, mesh or fibrous [7]  | 3/38  | • • • Arrangements for igniting [3]  |
| 3/023       | • • • using means for regenerating the filters, e.g. by burning trapped particles [7]  |       |  |
| 3/025       | • • • using fuel burner or by adding fuel to exhaust [7]   |       |  |
| 3/027       | • • • using electric or magnetic heating [7]   |       |  |
| 3/028       | • • • using microwaves [7]   |       |  |
| 3/029       | • • • by adding non-fuel substances to exhaust [7]   |       |  |
| 3/031       | • • • having means for by-passing filters, e.g. when clogged or during cold engine start [7]   |       |  |
| 3/032       | • • • during filter regeneration only [7]  |       |  |
| 3/033       | • • • in combination with other devices [7]  |       |  |
| 3/035       | • • • with catalytic reactors [7]  |       |  |

## F01N

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| <p><b>5/00 Exhaust or silencing apparatus combined or associated with devices profiting by exhaust energy</b> (using kinetic or wave energy of exhaust gases in exhaust systems for charging F02B; predominant aspects of such devices, <u>see</u> the relevant classes for the devices)</p> <p>5/02   • the devices using heat</p> <p>5/04   • the devices using kinetic energy</p> <p><b>9/00 Electrical control of exhaust gas treating apparatus</b> (monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00; conjoint electrical control of two or more combustion engine functions F02D 43/00) [4]</p> <p><b>11/00 Monitoring or diagnostic devices for exhaust-gas treatment apparatus</b> [7]</p> <p><b>13/00 Exhaust or silencing apparatus characterised by constructional features</b> [2010.01]</p> | <p>13/02   • having two or more separate silencers in series [2010.01]</p> <p>13/04   • having two or more silencers in parallel, e.g. having interconnections for multi-cylinder engines [2010.01]</p> <p>13/06   • specially adapted for star-arrangement of cylinders, e.g. exhaust manifolds [2010.01]</p> <p>13/08   • Other arrangements or adaptations of exhaust conduits [2010.01]</p> <p>13/10   •   • of exhaust manifolds [2010.01]</p> <p>13/12   • specially adapted for submerged exhausting [2010.01]</p> <p>13/14   • having thermal insulation [2010.01]</p> <p>13/16   • Selection of particular materials [2010.01]</p> <p>13/18   • Construction facilitating manufacture, assembly or disassembly [2010.01]</p> <p>13/20   • having flared outlets, e.g. of fish-tail shape [2010.01]</p> <p><b>99/00 Subject matter not provided for in other groups of this subclass</b> [2010.01]</p> |
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