

# CPC COOPERATIVE PATENT CLASSIFICATION

## F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

### ENGINES OR PUMPS

## F02 COMBUSTION ENGINES; HOT-GAS OR COMBUSTION-PRODUCT ENGINE PLANTS

## F02N STARTING OF COMBUSTION ENGINES; STARTING AIDS FOR SUCH ENGINES, NOT OTHERWISE PROVIDED FOR

### NOTES

1. Attention is drawn to the notes preceding class [F01](#).
2. The starting of engines which are not explicitly stated to be combustion engines will be classified in this subclass insofar as their starting is equivalent to that of combustion engines.

#### Muscle-operated starting apparatus

- 1/00 Starting apparatus having hand cranks (with intermediate power storage [F02N 5/00](#) - [F02N 15/00](#))**
- 1/005 . {Safety means ([F02N 1/02](#) takes precedence)}
- 1/02 . having safety means preventing damage caused by reverse rotation
- 3/00 Other muscle-operated starting apparatus (with intermediate power storage [F02N 5/00](#) - [F02N 15/00](#))**
- 3/02 . having pull-cords
- 3/04 . having foot-actuated levers

- 9/04 . the pressure fluid being generated otherwise, e.g. by compressing air

- 11/00 Starting of engines by means of electric motors**
- 11/003 . {said electric motor being also used as a drive for auxiliaries, e.g. for driving transmission pumps or fuel pumps during engine stop}
- 11/006 . {using a plurality of electric motors}
- 11/02 . the motors having longitudinally-shiftable rotors
- 11/04 . the motors being associated with current generators
- 11/06 . . and with ignition apparatus
- 11/08 . Circuits {or control means} specially adapted for starting of engines
- 11/0803 . . {characterised by means for initiating engine start or stop ([F02N 11/0814](#) takes precedence)}
- 11/0807 . . . {Remote means}
- 11/0811 . . . {using a timer}
- 11/0814 . . {comprising means for controlling automatic idle-start-stop}
- 11/0818 . . . {Conditions for starting or stopping the engine or for deactivating the idle-start-stop mode}
- 11/0822 . . . . {related to action of the driver}
- 11/0825 . . . . {related to prevention of engine restart failure, e.g. disabling automatic stop at low battery state}
- 11/0829 . . . . {related to special engine control, e.g. giving priority to engine warming-up or learning}
- 11/0833 . . . . {Vehicle conditions ([F02N 11/0822](#), [F02N 11/0825](#) take precedence)}
- 11/0837 . . . . . {Environmental conditions thereof, e.g. traffic, weather or road conditions}
- 11/084 . . . . . {State of vehicle accessories, e.g. air condition or power steering}
- 11/0844 . . . {with means for restarting the engine directly after an engine stop request, e.g. caused by change of driver mind}
- 11/0848 . . {with means for detecting successful engine start, e.g. to stop starter actuation}
- 11/0851 . . {characterised by means for controlling the engagement or disengagement between engine and starter, e.g. meshing of pinion and engine gear}

#### Power-operated starting apparatus; Muscle-operated starting apparatus with intermediate power storage

- 5/00 Starting apparatus having mechanical power storage**
- 5/02 . of spring type
- 5/04 . of inertia type
- 7/00 Starting apparatus having fluid-driven auxiliary engines or apparatus**
- 7/02 . the apparatus being of single-stroke piston type, e.g. pistons acting on racks or pull-cords
- 7/04 . . the pistons acting on screw-threaded members to effect rotation
- 7/06 . the engines being of reciprocating-piston type (of internal-combustion type [F02N 7/10](#))
- 7/08 . the engines being of rotary type
- 7/10 . characterised by using auxiliary engines or apparatus of combustion type (by using explosive cartridges [F02N 13/00](#))
- 7/12 . . the engines being of rotary type, e.g. turbines ([F02N 7/14](#) takes precedence)
- 7/14 . . the starting engines being readily removable from main engines, e.g. of portable type
- 9/00 Starting of engines by supplying auxiliary pressure fluid to their working chambers**
- 9/02 . the pressure fluid being generated directly by combustion (by using explosive cartridges [F02N 13/00](#))

11/0855	. . . {during engine shutdown or after engine stop before start command, e.g. pre-engagement of pinion}	15/06	. . . the toothed gears being moved by axial displacement
11/0859	. . {specially adapted to the type of the starter motor or integrated into it}	2015/061	. . . . {said axial displacement being limited, e.g. by using a stopper}
11/0862	. . {characterised by the electrical power supply means, e.g. battery}	15/062	. . . . {Starter drives}
11/0866	. . . {comprising several power sources, e.g. battery and capacitor or two batteries}	15/063	. . . . . {with resilient shock absorbers}
11/087	. . {Details of the switching means in starting circuits, e.g. relays or electronic switches}	15/065	. . . . . {with blocking means}
2011/0874	. . . {characterised by said switch being an electronic switch}	15/066	. . . . . {the starter being of the coaxial type}
2011/0877	. . . {said switch being used as a series-parallel switch, e.g. to switch circuit elements from series to parallel connection}	15/067	. . . . . {the starter comprising an electro-magnetically actuated lever}
2011/0881	. . {Components of the circuit not provided for by previous groups}	15/068	. . . . . {starter drive being actuated by muscular force}
2011/0885	. . . {Capacitors, e.g. for additional power supply}	15/08	. . the gearing being of friction type
2011/0888	. . . {DC/DC converters}	15/10	. Safety devices not otherwise provided for
2011/0892	. . . {Two coils being used in the starting circuit, e.g. in two windings in the starting relay or two field windings in the starter}		
2011/0896	. . . {Inverters for electric machines, e.g. starter-generators}		
11/10	. Safety devices (F02N 11/08 takes precedence)	<b>19/00</b>	<b>Starting aids for combustion engines, not otherwise provided for</b>
11/101	. . {for preventing engine starter actuation or engagement}	19/001	. {Arrangements thereof}
11/103	. . . {according to the vehicle transmission or clutch status}	2019/002	. {Aiding engine start by acting on fuel}
11/105	. . . {when the engine is already running (F02N 11/0848 takes precedence)}	19/004	. {Aiding engine start by using decompression means or variable valve actuation}
11/106	. . {for stopping or interrupting starter actuation}	19/005	. {Aiding engine start by starting from a predetermined position, e.g. pre-positioning or reverse rotation}
11/108	. . {for diagnosis of the starter or its components}	2019/007	. . {using inertial reverse rotation}
11/12	. Starting of engines by means of mobile, e.g. portable, starting sets	2019/008	. . {the engine being stopped in a particular position}
11/14	. Starting of engines by means of electric starters with external current supply (F02N 11/12 takes precedence)	19/02	. Aiding engine start by thermal means, e.g. using lighted wicks
<b>13/00</b>	<b>Starting of engines, or driving of starting apparatus by use of explosives, e.g. stored in cartridges</b>	19/04	. . by heating of fluids used in engines
13/02	. Cartridges specially adapted therefor	19/06	. . . by heating of combustion-air by flame generating means, e.g. flame glow-plugs
<b>15/00</b>	<b>Other power-operated starting apparatus; Component parts, details, or accessories, not provided for in, or of interest apart from groups F02N 5/00 - F02N 13/00</b>	19/08	. . . . Arrangement thereof
15/003	. {Starters comprising a brake mechanism}	19/10	. . . by heating of engine coolants
15/006	. {Assembling or mounting of starting devices}	<b>99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>
15/02	. Gearing between starting-engines and started engines; Engagement or disengagement thereof	99/002	. {Starting combustion engines by ignition means}
15/021	. . {the gearing including disengaging starter jaws}	99/004	. . {Generation of the ignition spark}
15/022	. . {the starter comprising an intermediate clutch}	99/006	. . {Providing a combustible mixture inside the cylinder}
15/023	. . . {of the overrunning type}	99/008	. . {Providing a combustible mixture outside the cylinder}
15/025	. . . {of the friction type}	<b>2200/00</b>	<b>Parameters used for control of starting apparatus</b>
15/026	. . . {of the centrifugal type}	2200/02	. said parameters being related to the engine
15/027	. . . {of the pawl type}	2200/021	. . Engine crank angle
15/028	. . . {of the jaw type}	2200/022	. . Engine speed
15/04	. . the gearing including disengaging toothed gears	2200/023	. . Engine temperature
15/043	. . . {the gearing including a speed reducer}	2200/024	. . Engine oil temperature
15/046	. . . . {of the planetary type}	2200/025	. . Engine oil pressure
		2200/026	. . Catalyst temperature
		2200/04	. said parameters being related to the starter motor
		2200/041	. . Starter speed
		2200/042	. . Starter torque
		2200/043	. . Starter voltage
		2200/044	. . Starter current
		2200/045	. . Starter temperature or parameters related to it
		2200/046	. . Energy or power necessary for starting
		2200/047	. . Information about pinion position
		2200/048	. . Information about pinion speed, both translational or rotational speed

2200/06	. said parameters being related to the power supply or driving circuits for the starter	2300/102	. . Control of the starter motor speed; Control of the engine speed during cranking
2200/061	. . Battery state of charge [SOC]	2300/104	. . Control of the starter motor torque
2200/062	. . Battery current	2300/106	. . Control of starter current
2200/063	. . Battery voltage	2300/108	. . Duty cycle control or pulse width modulation [PWM]
2200/064	. . Battery temperature	2300/20	. characterised by the control method
2200/065	. . Relay current	2300/202	. . using different starting modes, methods, or actuators depending on circumstances, e.g. engine temperature or component wear
2200/066	. . Relay temperature	2300/2004	. . using adaptive control
2200/08	. said parameters being related to the vehicle or its components	2300/2006	. . using prediction of future conditions
2200/0801	. . Vehicle speed	2300/2008	. . using a model
2200/0802	. . Transmission state, e.g. gear ratio or neutral state	2300/2011	. . Control involving a delay; Control involving a waiting period before engine stop or engine start
2200/0803	. . Parking brake state	2300/30	. characterised by the use of digital means
2200/0804	. . Temperature inside the vehicle cabin	2300/302	. . using data communication
2200/0805	. . Detection of vehicle emergency state, e.g. from ABS, ESP, external sensors	2300/304	. . . with other systems inside the vehicle
2200/0806	. . Air condition state	2300/306	. . . with external senders or receivers, e.g. receiving signals from traffic lights, other vehicles or base stations
2200/0807	. . Brake booster state		
2200/0808	. . Steering state, e.g. state of power assisted steering		
2200/0809	. . Electrical loads		
2200/0811	. . Heating state		
2200/0812	. . Power-take-off state		
2200/0813	. . Windscreen wiper state		
2200/0814	. . Bonnet switches		
2200/0815	. . Vehicle door sensors		
2200/10	. said parameters being related to driver demands or status		
2200/101	. . Accelerator pedal position		
2200/102	. . Brake pedal position		
2200/103	. . Clutch pedal position		
2200/104	. . Driver's intention to turn, e.g. by evaluating direction indicators		
2200/105	. . Driver behaviours or types, e.g. sportive or economic type driver		
2200/106	. . Driver presence, e.g. detected by door lock, seat sensor or belt sensor		
2200/12	. said parameters being related to the vehicle exterior		
2200/121	. . Atmospheric pressure, e.g. for determination of geodetic height		
2200/122	. . Atmospheric temperature		
2200/123	. . Information about vehicle position, e.g. from navigation systems or GPS signals		
2200/124	. . Information about road conditions, e.g. road inclination or surface		
2200/125	. . Information about other vehicles, traffic lights or traffic congestion		
2200/14	. said parameter being related to wear of starter or other components, e.g. based on total number of starts or age		

### **Muscle-operated starting apparatus**

<b>2250/00</b>	<b>Problems related to engine starting or engine's starting apparatus</b>
2250/02	. Battery voltage drop at start, e.g. drops causing ECU reset
2250/04	. Reverse rotation of the engine
2250/06	. Engine stall and related control features, e.g. for automatic restart
2250/08	. Lubrication of starters; Sealing means for starters
<b>2300/00</b>	<b>Control related aspects of engine starting</b>
2300/10	. characterised by the control output, i.e. means or parameters used as a control output or target