

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### TRANSPORTING

#### B64 AIRCRAFT; AVIATION; COSMONAUTICS

#### B64C AEROPLANES; HELICOPTERS (air-cushion vehicles [B60V](#))

##### NOTE

As far as possible, classification is made according to constructional features; classification according to particular kinds of aircraft is normally regarded as being of secondary importance, except in cases where this is considered to be the characteristic feature.

##### WARNING

The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

[B64C 35/02](#) covered by [B64C 35/00](#)

#### Aircraft structures or fairings (boundary-layer controls [B64C 21/00](#))

		1/14	. Windows; Doors; Hatch covers or access panels; Surrounding frame structures; Canopies; Windscreens {accessories therefor, e.g. pressure sensors, water deflectors, hinges, seals, handles, latches, windscreen wipers} (fairings movable in conjunction with undercarriage elements <a href="#">B64C 25/16</a> ; bomb doors <a href="#">B64D 1/06</a> )
<b>1/00</b>	<b>Fuselages; Constructional features common to fuselages, wings, stabilising surfaces and the like (aerodynamical features common to fuselages, wings, stabilising surfaces, and the like <a href="#">B64C 23/00</a>; flight-deck installations <a href="#">B64D</a>)</b>		
1/0009	. {Aerodynamic aspects}	1/1407	. . {Doors; surrounding frames}
2001/0018	. {comprising two decks adapted for carrying passengers only}	1/1415	. . . {Cargo doors, e.g. incorporating ramps}
2001/0027	. . {arranged one above the other}	1/1423	. . . {Passenger doors}
2001/0036	. . {arranged side by side at the same level}	1/143	. . . . {of the plug type}
2001/0045	. {Fuselages characterised by special shapes}	1/1438	. . . . {of the sliding type}
2001/0054	. {Fuselage structures substantially made from particular materials}	1/1446	. . . {Inspection hatches (for engine cowls <a href="#">B64D 29/08</a> )}
2001/0063	. . {from wood}	1/1453	. . . {Drain masts}
2001/0072	. . {from composite materials}	1/1461	. . . {Structures of doors or surrounding frames}
2001/0081	. . {from metallic materials}	1/1469	. . . {Doors between cockpit and cabin}
2001/009	. {comprising decompression panels or valves for pressure equalisation in fuselages or floors}	1/1476	. . {Canopies; Windscreens or similar transparent elements}
1/06	. Frames; Stringers; Longerons {; Fuselage sections}	1/1484	. . . {Windows ( <a href="#">B64C 1/1492</a> takes precedence)}
1/061	. . {Frames}	1/1492	. . . {Structure and mounting of the transparent elements in the window or windscreen}
1/062	. . . {specially adapted to absorb crash loads}	1/16	. specially adapted for mounting power plant
1/063	. . . {Folding or collapsing to reduce overall dimensions, e.g. foldable tail booms (folding or collapsing wings <a href="#">B64C 3/56</a> )}	1/18	. Floors
1/064	. . {Stringers; Longerons}	1/20	. . specially adapted for freight
1/065	. . {Spars}	1/22	. Other structures integral with fuselages to facilitate loading {, e.g. cargo bays, cranes (cargo door type ramps <a href="#">B64C 1/1415</a> )}
1/066	. . {Interior liners}	1/24	. Steps mounted on, and retractable within, fuselages (readily removable <a href="#">B64D 9/00</a> )
1/067	. . . {comprising means for preventing icing or condensation conditions}	1/26	. Attaching the wing or tail units or stabilising surfaces
1/068	. . {Fuselage sections}	1/28	. Parts of fuselage relatively movable to improve pilots view
1/069	. . . {Joining arrangements therefor}	1/30	. Parts of fuselage relatively movable to reduce overall size for storage
1/08	. . Geodetic or other open-frame structures	1/32	. Severable or jettisonable parts of fuselage facilitating emergency escape (ejector seats <a href="#">B64D 25/10</a> )
1/10	. . Bulkheads		
1/12	. . Construction or attachment of skin panels		

- 1/34 . . comprising inflatable structural components  
([connection of valves to inflatable elastic bodies B60C 29/00](#))
- 1/36 . . adapted to receive antennas or radomes ([antennas or radomes per se H01Q](#))
- 1/38 . . Constructions adapted to reduce effects of aerodynamic or other external heating {([cooling structural parts of aircrafts with air flow B64D 13/006](#))}
- 1/40 . . Sound or heat insulation {, e.g. using insulation blankets ([insulating elements for vehicles, in general B60R 13/08](#))}
- 1/403 . . {Arrangement of fasteners specially adapted therefor, e.g. of clips ([in vehicles in general B60R 13/0206](#))}
- 1/406 . . . {in combination with supports for lines, e.g. for pipes or cables ([arrangement of elements of electric or fluid circuits specially adapted for vehicles, in general B60R 16/00](#); supports for pipes, cables or protective tubing [F16L 3/00](#); installations of electric cables or lines in vehicles [H02G 3/00](#))}
- 3/00 Wings** ([stabilising surfaces B64C 5/00](#); [ornithopter wings B64C 33/02](#))
- 3/10 . . Shape of wings
- 3/14 . . Aerofoil profile
- 3/141 . . . {[Circulation Control Airfoils](#)}
- 2003/142 . . . {with variable camber along the airfoil chord}
- 2003/143 . . . {comprising interior channels}
- 2003/144 . . . {including a flat surface on either the extrados or intrados}
- 2003/145 . . . {comprising 'Gurney' flaps}
- 2003/146 . . . {comprising leading edges of particular shape}
- 2003/147 . . . {comprising trailing edges of particular shape}
- 2003/148 . . . {comprising protuberances, e.g. for modifying boundary layer flow}
- 2003/149 . . . {for supercritical or transonic flow}
- 3/16 . . Frontal aspect
- 3/18 . . Spars; Ribs; Stringers ([attaching wing unit to fuselage B64C 1/26](#))
- 3/182 . . {Stringers, longerons}
- 3/185 . . {Spars}
- 3/187 . . {Ribs}
- 3/20 . . Integral or sandwich constructions ([layered products or sandwich constructions in general B32B](#))
- 3/22 . . Geodetic or other open-frame structures
- 3/24 . . Moulded or cast structures
- 3/26 . . Construction, shape, or attachment of separate skins, e.g. panels
- 3/28 . . Leading or trailing edges attached to primary structures, e.g. forming fixed slots
- 3/30 . . comprising inflatable structural components  
([connection of valves to inflatable elastic bodies B60C 29/00](#))
- 3/32 . . specially adapted for mounting power plant
- 3/34 . . Integrally-constructed tanks, e.g. for fuel ([other aircraft fuel tanks or fuel systems B64D](#))
- 3/36 . . Structures adapted to reduce effects of aerodynamic or other external heating {([cooling structural parts of aircrafts with air flow B64D 13/006](#))}
- 3/38 . . Adjustment of complete wings or parts thereof
- 3/385 . . {Variable incidence wings}
- 3/40 . . Varying angle of sweep
- 3/42 . . Adjusting about chordwise axes
- 3/44 . . Varying camber
- 2003/445 . . . {by changing shape according to the speed, e.g. by morphing}
- 3/46 . . . by inflatable elements ([connection of valves to inflatable elastic bodies B60C 29/00](#))
- 3/48 . . . by relatively-movable parts of wing structures
- 3/50 . . . by leading or trailing edge flaps ([ailerons B64C 9/00](#))
- 3/52 . . Warping
- 3/54 . . Varying in area ([flaps extendable to increase camber B64C 3/44](#))
- 2003/543 . . . {by changing shape according to the speed, e.g. by morphing}
- 3/546 . . . {by foldable elements}
- 3/56 . . Folding or collapsing to reduce overall dimensions of aircraft
- 3/58 . . provided with fences or spoilers ([adjustable for control purposes B64C 9/00](#))
- 5/00 Stabilising surfaces** ([attaching stabilising surfaces to fuselage B64C 1/26](#))
- 5/02 . . Tailplanes ([fins B64C 5/06](#))
- 5/04 . . Noseplanes
- 5/06 . . Fins ([specially for wings B64C 5/08](#))
- 5/08 . . mounted on or supported by wings
- 5/10 . . adjustable
- 5/12 . . for retraction against or within fuselage or nacelle
- 5/14 . . Varying angle of sweep
- 5/16 . . about spanwise axes
- 5/18 . . in area ([attaching stabilising surfaces to fuselage B64C 1/26](#))
- 7/00 Structures or fairings not otherwise provided for**
- 7/02 . . Nacelles
- 9/00 Adjustable control surfaces or members, e.g. rudders** ([trimming stabilising surfaces B64C 5/10](#))
- 2009/005 . . {Ailerons}
- 9/02 . . Mounting or supporting thereof
- 9/04 . . with compound dependent movements
- 9/06 . . with two or more independent movements
- 9/08 . . bodily displaceable ([varying camber of wings B64C 3/44](#))
- 9/10 . . one surface adjusted by movement of another, e.g. servo tabs ([B64C 9/04 takes precedence; adjusting surfaces of different type or function B64C 9/12](#))
- 9/12 . . surfaces of different type or function being simultaneously adjusted
- 9/14 . . forming slots ([boundary-layer control B64C 21/00](#))
- 2009/143 . . . {comprising independently adjustable elements for closing or opening the slot between the main wing and leading or trailing edge flaps}
- 9/146 . . . {at an other wing location than the rear or the front ([wings provided with fixed fences or spoilers B64C 3/58](#))}
- 9/16 . . at the rear of the wing
- 9/18 . . . by single flaps
- 9/20 . . . by multiple flaps
- 9/22 . . at the front of the wing
- 9/24 . . . by single flap
- 9/26 . . . by multiple flaps
- 9/28 . . by flaps at both the front and rear of the wing operating in unison

- 9/30 . . . Balancing hinged surfaces, e.g. dynamically
- 9/32 . . . Air braking surfaces (braking by parachutes [B64D 17/80](#))
- 9/323 . . . {associated with wings}
- 9/326 . . . {associated with fuselages}
- 9/34 . . . collapsing or retracting against or within other surfaces or other members
- 9/36 . . . the members being fuselages or nacelles
- 9/38 . . . Jet flaps
- 11/00 Propellers, e.g. of ducted type; Features common to propellers and rotors for rotorcraft (rotors specially adapted for rotorcraft [B64C 27/32](#))**
- NOTE**
- Documents classified in [B64C 11/001](#) - [B64C 11/008](#) which also contain relevant information, covered by other subgroups of [B64C 11/00](#), are also classified in the appropriate subgroup of [B64C 11/00](#)
- 11/001 . . . {Shrouded propellers}
- 11/002 . . . {Braking propellers, e.g. for measuring the power output of an engine}
- 11/003 . . . {Variable-diameter propellers; Mechanisms therefor}
- 11/005 . . . {Spiral-shaped propellers}
- 11/006 . . . {Paddle wheels}
- 11/007 . . . {Propulsive discs, i.e. discs having the surface specially adapted for propulsion purposes}
- 11/008 . . . {characterised by vibration absorbing or balancing means (for rotorcraft [B64C 27/001](#))}
- 11/02 . . . Hub construction
- 11/04 . . . Blade mountings
- 11/06 . . . . . for variable-pitch blades
- 11/065 . . . . . {variable only when stationary}
- 11/08 . . . . . for non-adjustable blades
- 11/10 . . . . . rigid
- 11/12 . . . . . flexible
- 11/14 . . . Spinners
- 11/16 . . . Blades
- 11/18 . . . Aerodynamic features
- 11/20 . . . Constructional features
- 11/205 . . . . . {for protecting blades, e.g. coating}
- 11/22 . . . . . Solid blades
- 11/24 . . . . . Hollow blades
- 11/26 . . . . . Fabricated blades
- 11/28 . . . . . Collapsible or foldable blades
- 11/30 . . . Blade pitch-changing mechanisms
- NOTE**
- Groups [B64C 11/301](#), [B64C 11/303](#), [B64C 11/305](#) and [B64C 11/306](#) take precedence over [B64C 11/32](#), [B64C 11/38](#) and [B64C 11/44](#)
- 11/301 . . . {characterised by blade position indicating means}
- 11/303 . . . {characterised by comprising a governor}
- 11/305 . . . {characterised by being influenced by other control systems, e.g. fuel supply}
- 11/306 . . . {specially adapted for contrarotating propellers}
- 11/308 . . . . . {automatic}
- 11/32 . . . mechanical
- 11/325 . . . . . {comprising feathering, braking or stopping systems}
- 11/34 . . . . . automatic
- 11/343 . . . . . {actuated by the centrifugal force or the aerodynamic drag acting on the blades}
- 11/346 . . . . . {actuated by the centrifugal force or the aerodynamic drag acting on auxiliary masses or surfaces}
- 11/36 . . . . . non-automatic
- 11/38 . . . fluid, e.g. hydraulic
- 11/385 . . . . . {comprising feathering, braking or stopping systems}
- 11/40 . . . . . automatic
- 11/42 . . . . . non-automatic
- 11/44 . . . electric
- 11/46 . . . Arrangements of or constructional features peculiar to multiple propellers ([B64C 11/306](#) takes precedence)
- 11/48 . . . Units of two or more coaxial propellers
- 11/50 . . . Phase synchronisation between multiple propellers
- 13/00 Control systems or transmitting systems for actuating flying-control surfaces, lift-increasing flaps, air brakes, or spoilers**
- 13/02 . . . Initiating means
- 13/04 . . . actuated personally
- WARNING**
- Group [B64C 13/04](#) is impacted by reclassification into groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), [B64C 13/0427](#), and [B64C 13/044](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/042 . . . . . {operated by hand}
- WARNING**
- Groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), and [B64C 13/0427](#) are incomplete pending reclassification of documents from groups [B64C 13/04](#), [B64C 13/06](#), [B64C 13/08](#), [B64C 13/10](#), [B64C 13/12](#), and [B64C 13/14](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/0421 . . . . . {control sticks for primary flight controls}
- 13/0423 . . . . . {yokes or steering wheels for primary flight controls}
- 13/0425 . . . . . {for actuating trailing or leading edge flaps, air brakes or spoilers}
- 13/0427 . . . . . {for actuating trim}
- 13/044 . . . . . {operated by feet, e.g. pedals}
- WARNING**
- Group [B64C 13/044](#) is incomplete pending reclassification of documents from groups [B64C 13/04](#), [B64C 13/06](#), [B64C 13/08](#), [B64C 13/10](#), [B64C 13/12](#), and [B64C 13/14](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 13/06 . . . adjustable to suit individual persons
- WARNING**
- Group [B64C 13/06](#) is impacted by reclassification into groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), [B64C 13/0427](#), and [B64C 13/044](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/08 . . . Trimming zero positions
- WARNING**
- Group [B64C 13/08](#) is impacted by reclassification into groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), [B64C 13/0427](#), and [B64C 13/044](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/10 . . . comprising warning devices
- WARNING**
- Group [B64C 13/10](#) is impacted by reclassification into groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), [B64C 13/0427](#), and [B64C 13/044](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/12 . . . Dual control apparatus
- WARNING**
- Group [B64C 13/12](#) is impacted by reclassification into groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), [B64C 13/0427](#), and [B64C 13/044](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/14 . . . lockable (locking in position to suit individual persons [B64C 13/06](#))
- WARNING**
- Group [B64C 13/14](#) is impacted by reclassification into groups [B64C 13/042](#), [B64C 13/0421](#), [B64C 13/0423](#), [B64C 13/0425](#), [B64C 13/0427](#), and [B64C 13/044](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/16 . . actuated automatically, e.g. responsive to gust detectors
- 13/18 . . . using automatic pilot
- 13/20 . . . using radiated signals
- 13/22 . . . readily revertible to personal control
- 13/24 . Transmitting means
- 13/26 . . without power amplification or where power amplification is irrelevant
- 13/28 . . . mechanical
- WARNING**
- Groups [B64C 13/28](#), [B64C 13/30](#), [B64C 13/32](#), and [B64C 13/34](#) are impacted by reclassification into groups [B64C 13/341](#), [B64C 13/343](#), and [B64C 13/345](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/30 . . . . using cable, chain, or rod mechanisms
- 13/32 . . . . using cam mechanisms
- 13/34 . . . . using toothed gearing
- 13/341 . . . . {having duplication or stand-by provisions}
- WARNING**
- Group [B64C 13/341](#) is incomplete pending reclassification of documents from groups [B64C 13/28](#), [B64C 13/30](#), [B64C 13/32](#), [B64C 13/34](#), [B64C 13/42](#), [B64C 13/44](#), and [B64C 13/46](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/343 . . . . {overriding of personal controls; with automatic return to inoperative position}
- WARNING**
- Group [B64C 13/343](#) is incomplete pending reclassification of documents from groups [B64C 13/28](#), [B64C 13/30](#), [B64C 13/32](#), [B64C 13/34](#), [B64C 13/42](#), [B64C 13/44](#), and [B64C 13/46](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/345 . . . . {with artificial feel}
- WARNING**
- Group [B64C 13/345](#) is incomplete pending reclassification of documents from groups [B64C 13/28](#), [B64C 13/30](#), [B64C 13/32](#), [B64C 13/34](#), [B64C 13/42](#), [B64C 13/44](#), and [B64C 13/46](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 13/36 . . . fluid
- 13/38 . . with power amplification
- 13/40 . . . using fluid pressure
- WARNING**
- Group [B64C 13/40](#) is impacted by reclassification into groups [B64C 13/504](#), [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 13/42 . . . . having duplication or stand-by provisions  
**WARNING**  
 Group [B64C 13/42](#) is impacted by reclassification into groups [B64C 13/341](#), [B64C 13/343](#), [B64C 13/345](#), [B64C 13/504](#), [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/44 . . . . overriding of personal controls; with automatic return to inoperative position  
**WARNING**  
 Group [B64C 13/44](#) is impacted by reclassification into groups [B64C 13/341](#), [B64C 13/343](#), [B64C 13/345](#), [B64C 13/504](#), [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/46 . . . . with artificial feel  
**WARNING**  
 Group [B64C 13/46](#) is impacted by reclassification into groups [B64C 13/341](#), [B64C 13/343](#), [B64C 13/345](#), [B64C 13/504](#), [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/48 . . . . characterised by the fluid being gaseous  
 13/50 . . . . using electrical energy  
**WARNING**  
 Group [B64C 13/50](#) is impacted by reclassification into groups [B64C 13/504](#), [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/503 . . . . {Fly-by-Wire}  
**WARNING**  
 Group [B64C 13/503](#) is impacted by reclassification into groups [B64C 13/504](#), [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/504 . . . . {using electro-hydrostatic actuators [EHA's]}  
**WARNING**  
 Group [B64C 13/504](#) is incomplete pending reclassification of documents from groups [B64C 13/40](#), [B64C 13/42](#), [B64C 13/44](#), [B64C 13/46](#), [B64C 13/50](#), and [B64C 13/503](#). Group [B64C 13/504](#) is also impacted by reclassification into groups [B64C 13/505](#), [B64C 13/506](#), and [B64C 13/507](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/505 . . . . {having duplication or stand-by provisions}  
**WARNING**  
 Group [B64C 13/505](#) is incomplete pending reclassification of documents from groups [B64C 13/40](#), [B64C 13/42](#), [B64C 13/44](#), [B64C 13/46](#), [B64C 13/50](#), and [B64C 13/503](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/506 . . . . {overriding of personal controls; with automatic return to inoperative position}  
**WARNING**  
 Group [B64C 13/506](#) is incomplete pending reclassification of documents from groups [B64C 13/40](#), [B64C 13/42](#), [B64C 13/44](#), [B64C 13/46](#), [B64C 13/50](#), and [B64C 13/503](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 13/507 . . . . {with artificial feel}  
**WARNING**  
 Group [B64C 13/507](#) is incomplete pending reclassification of documents from groups [B64C 13/40](#), [B64C 13/42](#), [B64C 13/44](#), [B64C 13/46](#), [B64C 13/50](#), and [B64C 13/503](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.
- 15/00 Attitude, flight direction, or altitude control by jet reaction**  
 15/02 . the jets being propulsion jets  
 15/12 . . the power plant being tiltable  
 15/14 . the jets being other than main propulsion jets ([jet flaps B64C 9/38](#))
- 17/00 Aircraft stabilisation not otherwise provided for**  
 17/02 . by gravity or inertia-actuated apparatus  
 17/04 . . by pendular bodies  
 17/06 . . by gyroscopic apparatus ([automatic pilot control B64C 13/18](#))  
 17/08 . by ballast supply or discharge ([for lighter-than-air aircraft B64B](#))

- 17/10 . Transferring fuel to adjust trim
- 19/00 **Aircraft control not otherwise provided for**
- 19/02 . Conjoint controls
- 23/076 . . . . {the wing tip airfoil devices comprising one or more separate moveable members thereon affecting the vortices, e.g. flaps}

**WARNING**

Group [B64C 23/076](#) is incomplete pending reclassification of documents from group [B64C 23/065](#).

All groups listed in this Warning should be considered in order to perform a complete search.

**Influencing air-flow over aircraft surfaces, not otherwise provided for**

- 21/00 **Influencing air-flow over aircraft surfaces by affecting boundary-layer flow (boundary-layer control in general [F15D](#))**
- 21/02 . by use of slot, ducts, porous areas, or the like
- 21/025 . . {for simultaneous blowing and sucking}
- 21/04 . . for blowing ([B64C 21/08](#) takes precedence)
- 21/06 . . for sucking ([B64C 21/08](#) takes precedence)
- 21/08 . . adjustable
- 21/10 . using other surface properties, e.g. roughness

**23/00 Influencing air-flow over aircraft surfaces, not otherwise provided for**

- 23/005 . {by other means not covered by groups [B64C 23/02](#) - [B64C 23/08](#), e.g. by electric charges, magnetic panels, piezoelectric elements, static charges or ultrasounds}
- 23/02 . by means of rotating members of cylindrical or similar form
- 23/04 . by generating shock waves
- 23/06 . by generating vortices
- 23/065 . . {at the wing tips}

**WARNING**

Group [B64C 23/065](#) is impacted by reclassification into groups [B64C 23/069](#), [B64C 23/072](#), [B64C 23/076](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 23/069 . . . {using one or more wing tip airfoil devices, e.g. winglets, splines, wing tip fences or raked wingtips}

**WARNING**

Group [B64C 23/069](#) is incomplete pending reclassification of documents from group [B64C 23/065](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 23/072 . . . . {the wing tip airfoil devices being moveable in their entirety}

**WARNING**

Group [B64C 23/072](#) is incomplete pending reclassification of documents from group [B64C 23/065](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 23/08 . using Magnus effect
- 25/00 **Alighting gear (air-cushion alighting gear [B60V 3/08](#))**
- 25/001 . {Devices not provided for in the groups [B64C 25/02](#) - [B64C 25/68](#)}
- 2025/003 . . {Means for reducing landing gear noise, or turbulent flow around it, e.g. landing gear doors used as deflectors}
- 2025/005 . . {Tail skids for fuselage tail strike protection on tricycle landing gear aircraft}
- 2025/006 . . {Landing gear legs comprising torque arms}
- 2025/008 . . {Comprising means for modifying their length, e.g. for kneeling, for jumping, or for leveling the aircraft}
- 25/02 . Undercarriages
- 25/04 . . Arrangement or disposition on aircraft
- 25/06 . . fixed
- 25/08 . . non-fixed, e.g. jettisonable
- 25/10 . . . retractable, foldable, or the like
- 25/12 . . . . sideways
- 2025/125 . . . . . {into the fuselage, e.g. main landing gear pivotally retracting into or extending out of the fuselage}
- 25/14 . . . . fore-and-aft
- 25/16 . . . . Fairings movable in conjunction with undercarriage elements
- 25/18 . . . . Operating mechanisms
- 25/20 . . . . . mechanical
- 25/22 . . . . . fluid
- 25/24 . . . . . electric
- 25/26 . . . . . Control or locking systems therefor
- 25/28 . . . . . with indicating or warning devices
- 25/30 . . . . . emergency actuated
- 25/32 . characterised by the ground or like engaging elements ([arrestor hooks \[B64C 25/68\]\(#\)](#))
- 2025/325 . . {specially adapted for helicopters}
- 25/34 . . wheeled type, e.g. multi-wheeled bogies
- 2025/345 . . . {Multi-wheel bogies having one or more steering axes}
- 25/36 . . . Arrangements or adaptations of wheels, tyres, or axles in general ([construction of wheels or axles \[B60B\]\(#\)](#); [construction of tyres in general \[B60C\]\(#\)](#))
- 25/38 . . endless-track type
- 25/40 . . the elements being rotated before touch-down
- 25/405 . . . {Powered wheels, e.g. for taxiing}
- 25/42 . . Arrangements or adaptations of brakes ([the ground braking force being regulated, at least in part, by a speed condition, e.g. acceleration or deceleration of the ground engaging alighting gear, \[B60T 8/32\]\(#\)](#))

- 25/423 . . . {Braking devices acting by reaction of gaseous medium ([B64C 25/426 takes precedence; using rockets B64D 27/023](#))}
- 25/426 . . . {Braking devices providing an automatic sequence of braking}
- 25/44 . . . Actuating mechanisms
- 25/445 . . . . {Brake regulators for preventing somersaulting}
- 25/46 . . . . Brake regulators for preventing skidding or aircraft somersaulting {(anti-skidding regulators; electric or electronic controllers therefor [B60T 8/1703](#))}
- 25/48 . . . . differentially operated for steering purposes
- 25/50 . . Steerable undercarriages; Shimmy damping (steering devices applicable to land vehicles [B62D](#))
- 25/505 . . . {Shimmy damping}
- 25/52 . . Skis or runners
- 25/54 . . Floats
- 25/56 . . . inflatable (connection of valves to inflatable elastic bodies [B60C 29/00](#))
- 25/58 . . Arrangements or adaptations of shock-absorbers or springs (shimmy dampers [B64C 25/50](#); vehicle suspension arrangements in general [B60G](#); shock absorber *per se* [F16F](#))
- 25/60 . . . Oleo legs
- 25/62 . . . Spring shock-absorbers; Springs
- 25/64 . . . . using rubber or like elements
- 25/66 . . Convertible alighting gear; Combinations of different kinds of ground or like engaging elements
- 25/68 . . Arrester hooks (arresting gear, e.g. on aircraft carriers [B64F](#))
- 27/06 . . with single rotor
- 27/08 . . with two or more rotors
- 27/10 . . . arranged coaxially
- 27/12 . . Rotor drives
- 2027/125 . . . {including toroidal transmissions, e.g. of the CVT type}
- 27/14 . . . Direct drive between power plant and rotor hub
- 27/16 . . . Drive of rotors by means, e.g. propellers, mounted on rotor blades
- 27/18 . . . . the means being jet-reaction apparatus
- 27/20 . Rotorcraft characterised by having shrouded rotors, e.g. flying platforms
- 27/22 . Compound rotorcraft, i.e. aircraft using in flight the features of both aeroplane and rotorcraft
- 27/24 . . with rotor blades fixed in flight to act as lifting surfaces
- 27/26 . . characterised by provision of fixed wings
- 27/28 . . with forward-propulsion propellers pivotable to act as lifting rotors
- 27/30 . . with provision for reducing drag of inoperative rotor
- 27/32 . Rotors (features common to rotors and propellers [B64C 11/00](#))
- 27/322 . . {Blade travel limiting devices, e.g. droop stops}
- 27/325 . . {Circulation-control rotors}
- 27/327 . . {Retention means relieving the stress from the arm, e.g. tie-bars}
- 27/33 . . having flexing arms
- 27/35 . . having elastomeric joints
- 27/37 . . having articulated joints ([B64C 27/33](#), [B64C 27/35 take precedence](#))
- 27/39 . . . with individually articulated blades, i.e. with flapping or drag hinges
- 27/41 . . . with flapping or universal joint, common to the blades
- 27/43 . . . . see-saw type, i.e. two-bladed rotor
- 27/45 . . . with a feathering hinge only
- 27/46 . . Blades
- 27/463 . . . {Blade tips}
- 27/467 . . . Aerodynamic features {([B64C 27/463 takes precedence](#))}
- 27/473 . . . Constructional features {([B64C 27/463 takes precedence](#))}
- 2027/4733 . . . . {Rotor blades substantially made from particular materials}
- 2027/4736 . . . . . {from composite materials}
- 27/48 . . . . Root attachment to rotor head
- 27/50 . . . . Blades foldable to facilitate stowage of aircraft
- 27/51 . Damping of blade movements
- 27/52 . Tilting of rotor bodily relative to fuselage (of see-saw type construction [B64C 27/43](#))
- 27/54 . Mechanisms for controlling blade adjustment or movement relative to rotor head, e.g. lag-lead movement
- 27/56 . . Initiating means, e.g. actuated personally
- 27/57 . . . automatic or condition responsive, e.g. responsive to rotor speed, torque or thrust
- 27/58 . . Transmitting means
- 27/59 . . . mechanical
- 27/605 . . . . including swash plate, spider or cam mechanisms
- 27/615 . . . . including flaps mounted on blades

**Aircraft kinds and components not otherwise provided for**

- 27/00 Rotorcraft; Rotors peculiar thereto (alighting gear [B64C 25/00](#))**
- 27/001 . {Vibration damping devices}
- 2027/002 . . {mounted between the rotor drive and the fuselage}
- 2027/003 . . {mounted on rotor hub, e.g. a rotary force generator}
- 2027/004 . . {using actuators, e.g. active systems}
- 2027/005 . . {using suspended masses}
- 27/006 . {Safety devices}
- 27/007 . . {adapted for detection of blade cracks}
- 27/008 . {Rotors tracking or balancing devices}
- 27/02 . Gyroplanes
- 27/021 . . {Rotor or rotor head construction (for helicopters [B64C 27/32](#))}
- 27/022 . . . {Devices for folding or adjusting the blades}
- 27/023 . . . {Construction of the blades; Coating of the blades}
- 27/024 . . . {Devices for shifting the rotor axis}
- 27/025 . . . {Rotor drives, in particular for taking off; Combination of autorotation rotors and driven rotors}
- 27/026 . . . {Devices for converting a fixed wing into an autorotation rotor and viceversa}
- 27/027 . . {Control devices using other means than the rotor}
- 27/028 . . {Other constructional elements; Rotor balancing}
- 27/04 . Helicopters

- 27/625 . . . . including rotating masses or servo rotors
- 27/635 . . . . specially for controlling lag-lead movements of blades
- 27/64 . . . . using fluid pressure
- 27/68 . . . . using electrical energy
- 27/72 . . Means acting on blades
- 2027/7205 . . . {on each blade individually, e.g. individual blade control [IBC]}
- 2027/7211 . . . . {without flaps}
- 2027/7216 . . . . . {using one actuator per blade}
- 2027/7222 . . . . . {using airfoil deformation}
- 2027/7227 . . . . . {using blowing slots actuated by piezoelectric actuators}
- 2027/7233 . . . . . {using higher-harmonic control [HHC]}
- 2027/7238 . . . . . {by controlling existing swash plate actuators}
- 2027/7244 . . . . . {by using dedicated actuators}
- 2027/725 . . . . . {using jets controlled by piezoelectric actuators}
- 2027/7255 . . . . . {using one or more swash plates}
- 2027/7261 . . . . . {with flaps}
- 2027/7266 . . . . . {actuated by actuators}
- 2027/7272 . . . . . {of the electro-hydraulic type}
- 2027/7277 . . . . . {of the magnetostrictive type}
- 2027/7283 . . . . . {of the piezoelectric type}
- 2027/7288 . . . . . {of the memory shape type}
- 2027/7294 . . . . . {actuated mechanically, e.g. by means of linkages}
- 27/78 . . in association with pitch adjustment of blades of anti-torque rotor
- 27/80 . . for differential adjustment of blade pitch between two or more lifting rotors
- 27/82 . characterised by the provision of an auxiliary rotor or fluid-jet device for counter-balancing lifting rotor torque or changing direction of rotorcraft
- 2027/8209 . . {Electrically driven tail rotors}
- 2027/8218 . . {wherein the rotor or the jet axis is inclined with respect to the longitudinal horizontal or vertical plane of the helicopter}
- 2027/8227 . . {comprising more than one rotor}
- 2027/8236 . . {including pusher propellers}
- 2027/8245 . . {using air jets}
- 2027/8254 . . {Shrouded tail rotors, e.g. "Fenestron" fans}
- 2027/8263 . . {comprising in addition rudders, tails, fins, or the like}
- 2027/8272 . . . {comprising fins, or movable rudders}
- 2027/8281 . . . {comprising horizontal tail planes}
- 2027/829 . . . {comprising a V-tail units}
- 29/00 Aircraft capable of landing or taking-off vertically (attitude, flight direction, or altitude control by jet reaction [B64C 15/00](#); rotorcraft [B64C 27/00](#); air-cushion vehicles [B60V](#))**
- 29/0008 . {having its flight directional axis horizontal when grounded}
- 29/0016 . . {the lift during taking-off being created by free or ducted propellers or by blowers}
- 29/0025 . . . {the propellers being fixed relative to the fuselage}
- 29/0033 . . . {the propellers being tiltable relative to the fuselage}
- 29/0041 . . {the lift during taking-off being created by jet motors}
- 29/005 . . . {the motors being fixed relative to the fuselage}
- 29/0058 . . . {with vertical jet}
- 29/0066 . . . {with horizontal jet and jet deflector}
- 29/0075 . . . {the motors being tiltable relative to the fuselage}
- 29/0083 . . {the lift during taking-off being created by several motors of different type}
- 29/0091 . {Accessories not provided for elsewhere}
- 29/02 . having its flight directional axis vertical when grounded
- 29/04 . . characterised by jet-reaction propulsion
- 30/00 Supersonic-type aircraft**
- 31/00 Aircraft intended to be sustained without power plant; Powered hang-glider-type aircraft; Microlight-type aircraft**
- 31/02 . Gliders, e.g. sailplanes ([hang-gliders B64C 31/028](#))
- 31/024 . . with auxiliary power plant
- 31/028 . Hang-glider-type aircraft; Microlight-type aircraft
- 31/0285 . . {Safety devices}
- 31/032 . . having delta shaped wing
- 31/036 . . having parachute-type wing ([parachutes B64D 17/00](#))
- 31/04 . Man-powered aircraft ([ornithopters B64C 33/00](#))
- 31/06 . Kites ([hang-gliders B64C 31/028](#); toy aspects [A63H 27/08](#); towed targets [F41J](#) ; for propelling boats [B63H 9/0685](#); for propelling wind driven boards, control means and harnesses therefor [B63B 35/7976](#))
- 2031/065 . . {of inflatable wing type}
- 33/00 Ornithopters**
- 33/02 . Wings; Actuating mechanisms therefor
- 33/025 . . {the entire wing moving either up or down}
- 35/00 Flying-boats; Seaplanes ([alighting gear B64C 25/00](#))**
- 35/001 . {with means for increasing stability on the water}
- 35/002 . . {using adjustable auxiliary floats}
- 35/003 . . {using auxiliary floats at the wing tips}
- 35/005 . {with propellers, rudders or brakes acting in the water}
- 35/006 . {with lift generating devices}
- 35/007 . {Specific control surfaces therefor}
- 35/008 . {Amphibious sea planes}
- 37/00 Convertible aircraft (vehicles capable of travelling in or on different media [B60F](#))**
- 37/02 . Flying units formed by separate aircraft ([towing, air-refuelling, or aircraft-carrying aircraft B64D](#))
- 39/00 Aircraft not otherwise provided for**
- 39/001 . {Flying saucers}
- 39/003 . {with wings, paddle wheels, bladed wheels, moving or rotating in relation to the fuselage ([rotorcraft B64C 27/00](#), [ornithopters B64C 33/00](#))}
- 39/005 . . {about a horizontal transversal axis}
- 39/006 . . {about a vertical axis}
- 39/008 . . {about a longitudinal axis}
- 39/02 . characterised by special use
- 39/022 . . {Tethered aircraft}
- 39/024 . . {of the remote controlled vehicle type, i.e. RPV}
- 39/026 . . {for use as personal propulsion unit}
- 39/028 . . {Microsized aircraft}



- 39/04 . having multiple fuselages or tail booms
  - 39/06 . having disc- or ring-shaped wings ([B64C 39/001 takes precedence](#))
  - 39/062 . . {having annular wings}
  - 39/064 . . . {with radial airflow}
  - 39/066 . . {having channel wings}
  - 39/068 . . {having multiple wings joined at the tips}
  - 39/08 . having multiple wings ([B64C 39/06 takes precedence](#))
  - 39/10 . All-wing aircraft ([B64C 39/001 takes precedence](#))
  - 2039/105 . {of blended wing body type}
  - 39/12 . Canard-type aircraft
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- 2201/00 Unmanned aerial vehicles; Equipment therefor**
  - 2201/02 . characterized by type of aircraft
  - 2201/021 . . Airplanes, i.e. having wings and tail planes
  - 2201/022 . . Balloons, blimps or airships
  - 2201/024 . . Helicopters, or autogiros
  - 2201/025 . . Ornithopters, i.e. generating lift and propulsion by flapping wings or insect like means
  - 2201/027 . . Flying platforms
  - 2201/028 . . of all-wing types
  - 2201/04 . characterised by type of power plant
  - 2201/042 . . by electric motors; Electric power sources therefor, e.g. fuel cells, solar panels or batteries
  - 2201/044 . . by internal combustion engines, e.g. oscillating piston or rotary piston engines
  - 2201/046 . . by rocket engines, ramjets, or pulse-reactors
  - 2201/048 . . by jet turbines, or turbofans
  - 2201/06 . characterised by in-flight supply of energy
  - 2201/063 . . by refueling
  - 2201/066 . . by recharging of batteries, e.g. by induction
  - 2201/08 . characterised by the launching method
  - 2201/082 . . Released from other aircraft
  - 2201/084 . . using catapults
  - 2201/086 . . by taking-off horizontally by own power, e.g. from a runway
  - 2201/088 . . Vertical take-off using special means ([for helicopters B64C 2201/024; for balloons B64C 2201/022](#))
  - 2201/10 . characterised by the lift producing means
  - 2201/101 . . Lifting aerostatically, e.g. using lighter-than-air gases in chambers
  - 2201/102 . . Deployable wings, e.g. foldable or morphing wings
  - 2201/104 . . Fixed wings
  - 2201/105 . . Inflatable wings
  - 2201/107 . . Parachutes; Parasails; Kites; Membranes
  - 2201/108 . . using rotors, or propellers
  - 2201/12 . adapted for particular use
  - 2201/121 . . for dropping bombs; for electronic warfare; Flying bombs
  - 2201/122 . . as communication relays, e.g. high altitude platforms
  - 2201/123 . . for imaging, or topography
  - 2201/125 . . for meteorology
  - 2201/126 . . adapted for performing different kinds of missions, e.g. multipurpose use
  - 2201/127 . . for photography, or video recording, e.g. by using cameras
  - 2201/128 . . for transporting goods other than bombs
  - 2201/14 . characterised by flight control
  - 2201/141 . . autonomous, i.e. by navigating independently from ground or air stations, e.g. by using inertial navigation systems [INS]
  - 2201/143 . . . adapted for flying in formations
  - 2201/145 . . . using satellite radio beacon positioning systems, e.g. GPS
  - 2201/146 . . Remote controls
  - 2201/148 . . . using tethers for connecting to ground station
  - 2201/16 . characterised by type of propulsion unit
  - 2201/162 . . using ducted fans or propellers
  - 2201/165 . . using unducted propellers
  - 2201/167 . . using rockets, ramjets, pulse jets, plasma, or the like
  - 2201/18 . characterised by landing method
  - 2201/182 . . by being caught in mid-air, or next to the ground, e.g. using a net
  - 2201/185 . . by deploying parachutes, or the like
  - 2201/187 . . by landing horizontally, e.g. on a runway
  - 2201/20 . Methods for transport, or storage of unmanned aerial vehicles
  - 2201/201 . . in containers
  - 2201/203 . . in rucksacks, or bags to be carried by persons
  - 2201/205 . . by waterborne vehicles, e.g. ships or submarines or by hovercraft
  - 2201/206 . . by airborne vehicles, e.g. airplanes or helicopters
  - 2201/208 . . by landborne vehicles, e.g. trucks, lorries, tanks or cars
  - 2201/22 . having stealth characteristics
  - 2203/00 Flying model aircraft, flying toy aircraft**
  - 2211/00 Modular constructions of airplanes or helicopters**
  - 2220/00 Active noise reduction systems**
  - 2230/00 Boundary layer controls**
  - 2230/02 . by using acoustic waves generated by transducers
  - 2230/04 . by actively generating fluid flow
  - 2230/06 . by explicitly adjusting fluid flow, e.g. by using valves, variable aperture or slot areas, variable pump action or variable fluid pressure
  - 2230/08 . by influencing fluid flow by means of surface cavities, i.e. net fluid flow is null
  - 2230/10 . by influencing fluid flow by heating using other means than combustion
  - 2230/12 . by using electromagnetic tiles, fluid ionizers, static charges or plasma
  - 2230/14 . achieving noise reductions
  - 2230/16 . by blowing other fluids over the surface than air, e.g. He, H, O<sub>2</sub> or exhaust gases
  - 2230/18 . by using small jets that make the fluid flow oscillate
  - 2230/20 . by passively inducing fluid flow, e.g. by means of a pressure difference between both ends of a slot or duct
  - 2230/22 . by using a surface having multiple apertures of relatively small openings other than slots
  - 2230/24 . by using passive resonance cavities, e.g. without transducers
  - 2230/26 . by using rib lets or hydrophobic surfaces
  - 2230/28 . at propeller or rotor blades