

ECLA**EUROPEAN CLASSIFICATION****F16D****COUPLINGS FOR TRANSMITTING ROTATION; CLUTCHES; BRAKES**[N: **WARNING**

1. The following IPC groups are not used in the internal ECLA classification scheme. Subject matter covered by these groups is classified in the following ECLA groups:

F16D3/19	covered by	F16D3/50 ;
F16D3/27	covered by	F16D3/26B ;
F16D13/69	covered by	F16D13/52 , F16D13/64C , F16D13/68B ;
F16D27/07	covered by	F16D27/06 , F16D27/14 ;
F16D28/00	covered by	F16D27/00B ;
F16D41/061	covered by	F16D41/06F ;
F16D41/063	covered by	F16D41/06C , F16D41/06D ;
F16D41/064	covered by	F16D41/06H ;
F16D41/066	covered by	F16D41/06H3 , F16D41/06H3B ;
F16D41/067	covered by	F16D41/06H3C ;
F16D41/069	covered by	F16D41/06G ;
F16D48/12	covered by	B60K23/08B ;
F16D65/35	covered by	F16D63/00 .

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Note

Attention is drawn to the following places:

A01D69/08 , A01D69/10	Clutches or brakes of harvesting machines for grass or cereals;
A61C1/18	Clutches in dental machines for boring or cutting;
B21B35/14	Drive couplings for metal-rolling mills;
B30B15/10	Brakes specially adapted for presses;
B30B15/12	Clutches specially adapted for presses;
B41J33/52	Braking devices for ribbon-feed devices in selective printing mechanisms;
B60K17/00	Arrangement or location of clutches in vehicles;
B61H	Brakes peculiar to rail vehicles;
B62B5/04	Braking mechanisms for hand carts;
B62B9/08	Braking mechanisms for children`s carriages or perambulators;
B62C7/00	Braking mechanisms for animal-drawn vehicles;
B62L	Cycle brakes;
B66D5/00	Braking devices for lifting or hoisting gear;
E21B17/02	Couplings for drilling rods;
H02P3/04	Brakes for electric motors, generators, dynamo-electric converters;
H04L13/04	Clutches for apparatus for transmission of coded digital information.

Guide heading:

Couplings [N: for transmitting mechanical rotation] (fluid couplings [F16D31/00](#) to [F16D39/00](#); couplings or joints specially adapted for deep-drilling rods or sucker rods [E21B](#); for transmitting motion through a wall without relatively-moving surfaces [F16J15/50](#))

F16D1/00

Couplings for rigidly connecting two coaxial shafts or other movable machine elements (attachment of wheels to axles for railway carriages [B60B](#); for attachment of

cranks to their shafts [F16C3/10](#))

- F16D1/02 . for connecting two abutting shafts or the like
- F16D1/027 . . non-disconnectable, e.g. involving gluing, welding or the like [\[N9409\]](#)
- F16D1/033 . . by clamping together two faces perpendicular to the axis of rotation, e.g. with bolted flanges [\[N9409\]](#)
- F16D1/04 . . with clamping hub; with hub and longitudinal key
- F16D1/05 . . . with radial clamping due to axial loading of at least one pair of conical surfaces [\[N9507\]](#)

- F16D1/06 . for attachment of a member on a shaft or on a shaft-end ([attachment of marine propellers on shafts B63H23/34](#))
- F16D1/064 . . non-disconnectable [\[N9409\]](#)
- F16D1/068 . . . involving gluing, welding or the like [\[N9409\]](#)
- F16D1/072 . . . involving plastic deformation ([plastic welding F16D1/068](#)) [\[N9409\]](#)
- F16D1/076 . . by clamping together two faces perpendicular to the axis of rotation, e.g. with bolted flanges [\[N9409\]](#)
- F16D1/08 . . with clamping hub; with hub and longitudinal key
- F16D1/08C . . . [\[N: with radial clamping due to deformation of a resilient body or a body of fluid \(F16D1/09D takes precedence; elastic couplings F16D3/80; fluid pressure clutches F16D25/04\)\]](#) [\[C0009\]](#)
- F16D1/08D . . . [\[N: with radial clamping due to tilting of a hub part or ring about a diametral axis\]](#)
- F16D1/08E . . . [\[N: with radial clamping due to rotation along an eccentric surface, e.g. arcuate wedging elements \(similar clutches F16D17/00; similar free-wheel clutches F16D41/06\)\]](#)
- F16D1/08F . . . [\[N: with radial clamping of a helical wrap spring on the shaft or in the hub bore \(similar clutches F16D13/02B, F16D13/08, F16D27/02C, F16D27/10C; similar slip couplings F16D7/02C; similar free-wheel clutches F16D41/20C\)\]](#)
- F16D1/08G . . . [\[N: with radial loading of both hub and shaft by an intermediate ring or sleeve \(F16D1/08E, F16D1/08F, F16D1/09C take precedence\)\]](#) [\[C0009\]](#)
- F16D1/08G2 [\[N: due to the elasticity of the ring or sleeve\]](#)
- F16D1/08G3 [\[N: due to axial loading of the ring or sleeve, e.g. Belleville washers\]](#)
- F16D1/08H . . . [\[N: with radial clamping due to a radial screw\]](#)
- F16D1/08K . . . [\[N: with radial clamping between the mating surfaces of the hub and shaft \(F16D1/08C to F16D1/08E, F16D1/09 take precedence\)\]](#) [\[C0009\]](#)
- F16D1/08K2 [\[N: due to the elasticity of the hub \(including shrink fits\)\]](#)
- F16D1/08K3 [\[N: due to tangential loading of the hub, e.g. a split hub\]](#)
- F16D1/08K4 [\[N: due to other loading elements in the hub or shaft\]](#)
- F16D1/08L . . . [\[N: with axial keys and no other radial clamping\]](#)
- F16D1/08L2 [\[N: the key being axially tapered and tightening when loaded axially\]](#) [\[N9502\]](#)
- F16D1/08L2B [\[N: the key having two axially tapered interengaging parts\]](#) [\[N9502\]](#)
- F16D1/08M . . . [\[N: with other than axial keys, e.g. diametral pins, cotter pins and no other radial clamping\]](#)
- F16D1/09 . . . with radial clamping due to axial loading of at least one pair of conical surfaces [\[N: \(tapered keys F16D1/08L2\)\]](#) [\[N9505\]](#)
- F16D1/091 and comprising a chamber including a tapered piston moved axially by fluid

- pressure to effect clamping[N0504]
- F16D1/092 the pair of conical mating surfaces being provided on the coupled hub and shaft[N0504]
- F16D1/093 using one of more elastic segmented conical rings forming at least one of the conical surfaces, the rings being expanded or contracted to effect clamping(F16D1/091takes precedence)[N0504]
- F16D1/094 using one or more pairs of elastic or segmented rings with mutually mating conical surfaces, one of the mating rings being contracted and the other being expanded[N0504]
- F16D1/095 with clamping effected by ring contraction only[N: (for connecting two abutting shafts F16D1/02)][N0504]
- F16D1/096 the ring or rings being located between the shaft and the hub[N0504]
- F16D1/097 with clamping effected by ring expansion only, e.g. with an expanded ring located between hub and shaft[N0504]
- F16D1/10 . Quick-acting couplings in which the parts are connected by simply bringing them together axially
- F16D1/10B . . [N: without axial retaining means rotating with the coupling]
- F16D1/104 . . having retaining means rotating with the coupling and acting only by friction [N9409]
- F16D1/108 . . having retaining means rotating with the coupling and acting by interengaging parts, i.e. positive coupling [N9409]
- F16D1/112 . . . the interengaging parts comprising torque-transmitting surfaces, e.g. bayonet joints [N9409]
- F16D1/116 . . . the interengaging parts including a continuous or interrupted circumferential groove in the surface of one of the coupling parts (circlips for retaining hubs on shafts F16B21/18) [N9409]
- F16D1/12 . allowing adjustment of the parts about the axis (during motion F16D3/10)
- F16D3/00** **Yielding couplings, i.e. with means permitting movement between the connected parts during the drive** (couplings disconnectable simply by axial movement F16D1/10; slip couplings F16D7/00)
- F16D3/00F . [N: incorporating leaf springs, flexible parts of reduced thickness or the like acting as pivots]
- F16D3/02 . adapted to specific functions (universal joints, see the appropriate groups)
- F16D3/04 . . specially adapted to allow radial displacement, e.g. Oldham coupling
- F16D3/06 . . specially adapted to allow axial displacement
- F16D3/06B . . . [N: by means of rolling elements]
- F16D3/08 . . Couplings for intersecting shafts, provided with intermediate bars bent in an angle corresponding with the angle of intersection
- F16D3/10 . . Couplings with means for varying the angular relationship of two coaxial shafts during motion
- F16D3/12 . . specially adapted for accumulation of energy to absorb shocks or vibration (by making use of fluid elements F16D3/80)
- F16D3/14 . . combined with a friction coupling for damping vibration or absorbing shock
- F16D3/16 . Universal joints in which flexibility is produced by means of pivots or sliding or rolling

connecting parts

- F16D3/18 . . the coupling parts (1) having slidably-interengaging teeth
- F16D3/18C . . . [N: radial teeth connecting concentric inner and outer coupling parts]
- F16D3/20 . . one coupling part entering a sleeve of the other coupling part and connected thereto by sliding or rolling members ([F16D3/18](#), [F16D3/24](#) take precedence)

Note

"coupling parts" means the driving member and the driven member of the coupling to be mounted on and rotate as a unit with the shafts or their equivalents between which the coupling is placed. An intermediate member interconnecting these parts is regarded as such an equivalent.

- F16D3/202 . . . [N: one coupling part having radially projecting pins, e.g. tripod joints]
- F16D3/205 the pins extending radially outwardly from the coupling part
- F16D3/205B [N: having two pins] [N9903]
- F16D3/205C [N: having three pins, i.e. true tripod joints] [N9903]
- F16D3/205D [N: having four or more pins, e.g. with compensation for relative pin movement] [N9903]
- F16D3/207 the pins extending radially inwardly from the coupling part
- F16D3/22 . . . the rolling members being balls, rollers, or the like, guided in grooves or sockets in both coupling parts
- F16D3/221 the rolling members being located in sockets in one of the coupling parts
- F16D3/223 the rolling members being guided in grooves in both coupling parts [[C1101](#)]

[N: **WARNING**

[N1101]

Groups [F16D3/2233](#) and [F16D3/2237](#) are not yet complete pending a reorganisation; see also this group]

- F16D3/2233 where the track is made up of two curves with a point of inflexion in between, i.e. S-track joints [[N1101](#)]
- F16D3/2237 where the grooves are composed of radii and adjoining straight lines, i.e. undercut free [UF] type joints [[N1101](#)]
- F16D3/224 the groove centre-lines in each coupling part lying on a sphere
- F16D3/2245 where the groove centres are offset from the joint centre [[N1101](#)]

[N: **WARNING**

[N1101]

Not complete pending a reorganisation, see also group [F16D3/224](#)]

- F16D3/226 the groove centre-lines in each coupling part lying on a cylinder co-axial with the respective coupling part
- F16D3/226B [N: the joints being non-telescopic]
- F16D3/227 the joints being telescopic
- F16D3/229 Prismatic coupling parts having each groove centre-line lying on planes parallel to the axis of the respective coupling part ([F16D3/224](#), [F16D3/226](#) take precedence)
- F16D3/24 . . comprising balls, rollers, or the like between overlapping driving faces, e.g. cogs, on both coupling parts
- F16D3/26 . . Hooke's joints or other joints with an equivalent intermediate member to which each coupling part is pivotally or slidably connected ([F16D3/18](#), [F16D3/20](#) take precedence)

F16D3/26B	. . . [N: in which one coupling part has a tongue received with the intermediate member(s) in a recess with a transverse axis in the other coupling part]
F16D3/28	. . . in which the interconnecting pivots include elastic members
F16D3/30	. . . in which the coupling is specially adapted to constant velocity-ratio
F16D3/32	. . . . by the provision of two intermediate members each having two relatively perpendicular trunnions or bearings
F16D3/33	. . . . . with ball or roller bearings
F16D3/34	. . . . parts being connected by ridges, pins, balls, or the like guided in grooves or between cogs
F16D3/36	. . . in which each pivot between the coupling parts and the intermediate member comprises a single ball
F16D3/38	. . . with a single intermediate member with trunnions or bearings arranged on two axes perpendicular to one another (F16D3/36 takes precedence)
F16D3/38B	. . . . [N: constructional details of other than the intermediate member]
F16D3/38B2	. . . . . [N: Bearing cup; Bearing construction; Bearing seal; Mounting of bearing on the intermediate member (mounting of bearing in fork F16D3/38B)]
F16D3/38B3	. . . . . [N: Fork construction; Mounting of fork on shaft; Adapting shaft for mounting of fork]
F16D3/40	. . . . with intermediate member provided with two pairs of outwardly-directed trunnions on intersecting axes
F16D3/40C	. . . . . [N: Apparatus for assembling or dismantling]
F16D3/41	. . . . . with ball or roller bearings
F16D3/42	. . . . with ring-shaped intermediate member provided with bearings or inwardly-directed trunnions
F16D3/43	. . . . . with ball or roller bearings
F16D3/44	. . . the intermediate member being connected to the coupling parts by ridges, pins, balls, or the like guided in grooves or between cogs
F16D3/46	. . . . each coupling part embracing grooves or ridges on the intermediate member
F16D3/48	. . one coupling part having pins arranged parallel to the axis and entering holes in the other coupling part
F16D3/50	. with the coupling parts connected by one or more intermediate members (F16D3/16 takes precedence)
F16D3/52	. . comprising a continuous strip, spring, or the like engaging the coupling parts at a number of places
F16D3/54	. . Couplings comprising a chain or strip surrounding two wheels arranged side by side and provided with teeth or the equivalent
F16D3/56	. . comprising elastic metal lamellae, elastic rods, or the like, e.g. arranged radially or parallel to the axis, the member being shear-loaded collectively by the total load
F16D3/58	. . . the intermediate members being made of rubber or like material
F16D3/60	. . comprising pushing or pulling links attached to both parts (F16D3/64 takes precedence)
F16D3/62	. . . the links or their attachments being elastic
F16D3/64	. . comprising elastic elements arranged between substantially-radial walls of both coupling parts
F16D3/66	. . . the elements being metallic, e.g. in the form of coils
F16D3/68	. . . the elements being made of rubber or similar material
F16D3/70	. . comprising elastic elements arranged in holes in one coupling part and surrounding

- pins on the other coupling part
- F16D3/72
 - . . with axially-spaced attachments to the coupling parts ([F16D3/56](#) takes precedence)
- F16D3/72F
 - . . . [N: with an intermediate member made of fibre-reinforced resin (made of rubber-like material [F16D3/74](#); shafts made of fibre-reinforced resin [F16C3/02F](#))]
- F16D3/74
 - . . . the intermediate member or members being made of rubber or other [N: rubber-like] flexible material
- F16D3/76
 - . . shaped as an elastic ring centered on the axis, surrounding a portion of one coupling part and surrounded by a sleeve of the other coupling part
- F16D3/77
 - . . . the ring being metallic
- F16D3/78
 - . . shaped as an elastic disc or flat ring, arranged perpendicular to the axis of the coupling parts, different sets of spots of the disc or ring being attached to each coupling part, e.g. Hardy couplings
- F16D3/79
 - . . . the disc or ring being metallic
- F16D3/80
 - . in which a fluid is used (fluid couplings allowing continuous slip [F16D31/00](#) to [F16D35/00](#))
- F16D3/82
 - . . with a coupling element in the form of a pneumatic tube (similar clutches [F16D25/04](#))
- F16D3/84
 - . Shrouds, e.g. casings, covers; Sealing means specially adapted therefor
- F16D3/84B
 - . . [N: Open covers, e.g. guards for agricultural p.t.o. shafts]
- F16D3/84C
 - . . [N: enclosed covers]
- F16D3/84C2
 - . . . [N: allowing relative movement of joint parts due to the flexing of the cover]
- F16D3/84C3
 - . . . [N: allowing relative movement of joint parts due to sliding between parts of the cover]
- F16D5/00**

Impulse couplings, i.e. couplings that alternately accelerate and decelerate the driven member
- F16D7/00**

Slip couplings, e.g. slipping on overload, for absorbing shock (combined with yielding shaft couplings [F16D3/14](#); fluid slip couplings [F16D31/00](#) to [F16D35/00](#))
- F16D7/00B
 - . [N: the torque being transmitted and limited by yielding of an elastomeric race]
- F16D7/00D
 - . [N: the torque being transmitted and limited by rolling friction, e.g. ball bearings axially loaded]
- F16D7/00F
 - . [N: the torque being transmitted and limited by rolling surfaces skidding, e.g. skew needle rollers]
- F16D7/02
 - . of the friction type (couplings in which overload initiates a decrease of coupling pressure or a disconnection, see the relevant groups for clutches [N: e.g. for friction overload clutches [F16D43/21](#)])
- F16D7/02B
 - . . [N: with radially applied torque-limiting friction surfaces ([F16D7/02C](#) takes precedence)]
- F16D7/02C
 - . . [N: with a helical band or equivalent member co-operating with a cylindrical torque limiting coupling surface]

- F16D7/02D . . [N: with axially applied torque limiting friction surfaces]
- F16D7/02D2 . . . [N: with flat clutching surfaces, e.g. discs]
- F16D7/02D2B [N: with multiple lamellae]
- F16D7/02D3 . . . [N: with conical friction surfaces]
- F16D7/04 . of the ratchet type (similar gearings based on repeated accumulation and delivery of inertia-energy [F16H33/08](#); [N: overload clutches of the ratchet type [F16D43/202](#)])
- F16D7/04B . . [N: with at least one part moving axially between engagement and disengagement ([F16D7/08](#) takes precedence)]
- F16D7/04B2 . . . [N: the axially moving part being coaxial with the rotation, e.g. a gear with face teeth]
- F16D7/04B3 . . . [N: with a plurality of axially moving parts]
- F16D7/04C . . [N: with parts moving radially between engagement and disengagement ([F16D7/10](#) takes precedence)]
- F16D7/06 . . with intermediate ball or rollers
- F16D7/08 . . . moving axially between engagement and disengagement
- F16D7/10 . . . moving radially between engagement and disengagement

F16D9/00 **Couplings with safety member for disconnecting, e.g. breaking or melting member**

- F16D9/02 . by thermal means, e.g. melting member [\[N9509\]](#)
- F16D9/04 . by tensile breaking [\[N9509\]](#)
- F16D9/06 . by breaking due to shear stress [\[N9509\]](#)
- F16D9/08 . . over a single area encircling the axis of rotation, e.g. shear necks on shafts ([F16D9/10](#) takes precedence) [\[N9509\]](#)
- F16D9/10 . . having a part movable after disconnection so as to provide reconnection, e.g. advanceable shear pins [\[N9509\]](#)

Guide heading: **Clutches with mechanically-actuated clutching members** ([automatic clutches F16D41/00 to F16D45/00](#))

F16D11/00 **Clutches in which the members have interengaging parts** ([arrangements for synchronisation F16D23/02](#))

- F16D11/02 . disengaged by a contact of a part mounted on the clutch with a stationarily-mounted member
- F16D11/04 . . with clutching members movable only axially
- F16D11/06 . . with clutching member movable otherwise than only axially, e.g. rotatable keys
- F16D11/08 . actuated by moving a non-rotating part axially (actuating-mechanism in the relevant groups)
- F16D11/10 . . with clutching members movable only axially
- F16D11/12 . . with clutching members movable otherwise than only axially
- F16D11/14 . with clutching members movable only axially ([F16D11/02](#), [F16D11/08](#) take precedence)

- F16D11/16
 - with clutching members movable otherwise than only axially ([F16D11/02](#), [F16D11/08](#) take precedence)
- F16D13/00** **Friction clutches** (arrangements for synchronisation [F16D23/02](#))
- F16D13/02
 - disengaged by the contact of a part mounted on the clutch with a stationarily-mounted member
- F16D13/02B
 - . [\[N: with a helical band or equivalent member with two or more turns embracing a drum or the like \(electromagnetically actuated \[F16D27/10C\]\(#\)\)\]](#)
- F16D13/04
 - with means for actuating or keeping engaged by a force derived at least partially from one of the shafts to be connected ([automatic clutches \[F16D43/00\]\(#\)](#))
- F16D13/06
 - . with clutching members movable otherwise than only axially ([F16D13/08](#), [F16D13/12](#) take precedence)
- F16D13/08
 - with a helical band or equivalent member, which may be built up from linked parts, with more than one turn embracing a drum or the like, with or without an additional clutch actuating the end of the band ([F16D13/02](#) takes precedence; [\[N: similar slip couplings \[F16D7/02C\]\(#\); similar clutches electromagnetically actuated \[F16D27/02C\]\(#\), \[F16D27/10C\]\(#\)\]; similar free-wheel clutches \[F16D41/20\]\(#\); similar brakes \[F16D49/02\]\(#\)\)](#)
- F16D13/10
 - with clutching members co-operating with the periphery of a drum, a wheel-rim, or the like ([F16D13/02](#) to [F16D13/08](#) take precedence; similar brakes [F16D49/00](#))
- F16D13/12
 - with an expansible band or coil co-operating with the inner surface of a drum or the like ([F16D13/02](#) takes precedence; similar brakes [F16D51/02](#))
- F16D13/14
 - with outwardly-movable clutching members co-operating with the inner surface of a drum or the like ([F16D13/02](#), [F16D13/06](#), [F16D13/12](#) take precedence; similar brakes [F16D51/00](#))
- F16D13/16
 - . shaped as radially-movable segments
- F16D13/18
 - . shaped as linked or separately-pivoted segments
- F16D13/20
 - with clutching members co-operating with both the periphery and the inner surface of a drum or wheel-rim ([similar brakes \[F16D53/00\]\(#\)](#))
- F16D13/22
 - with axially-movable clutching members ([similar brakes \[F16D55/00\]\(#\)](#))
- F16D13/24
 - . with conical friction surfaces [\[N: cone clutches\]](#)
- F16D13/26
 - . . in which the or each axially-movable member is pressed exclusively against an axially-located member
- F16D13/28
 - . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
- F16D13/30
 - in which the clutching pressure is produced by springs only
- F16D13/32
 - . . . in which two or more axially-movable members are pressed from one side towards an axially-located member
- F16D13/34
 - . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
- F16D13/36
 - in which the clutching pressure is produced by springs only
- F16D13/38
 - . with flat clutching surfaces, e.g. discs
- F16D13/38B
 - . . [\[N: double clutches, i.e. comprising two friction disc mounted on one driven](#)

- shaft (with two concentric driven shafts [F16D21/06](#))]
- F16D13/40 . . . in which the or each axially-movable member is pressed exclusively against an axially-located member
 - F16D13/42 with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
 - F16D13/44 in which the clutching pressure is produced by springs only
 - F16D13/46 . . . in which two axially-movable members, of which one is attached to the driving side and the other to the driven side, are pressed from one side towards an axially-located member
 - F16D13/48 with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
 - F16D13/50 in which the clutching pressure is produced by springs only
 - F16D13/50B [N: Devices located between the flywheel and the driven disc, and biasing the driven disc away from the flywheel towards the disengaged position]
 - F16D13/52 . . . Clutches with multiple lamellae [N: Clutches in which three or more axially moveable members are fixed alternately to the shafts to be coupled and are pressed from one side towards an axially-located member ([F16D13/38B](#) takes precedence)]
 - F16D13/54 with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
 - F16D13/56 in which the clutching pressure is produced by springs only
 - F16D13/58 . Details [N: (tools for assembling or disassembling clutches [B25B27/00F5](#))]
 - F16D13/58C . . [N: Diaphragm-springs, e.g. Belleville (co-operation with a disengaging thrust ring or bearing [F16D23/14](#))]
 - F16D13/58C2 . . . [N: Arrangements or details relating to the mounting or support of the diaphragm on the clutch on the clutch cover or the pressure plate]
 - F16D13/60 . . Clutching elements ([friction lining or attachment thereof F16D69/00](#))
 - F16D13/62 . . . Clutch-bands; Clutch shoes; Clutch-drums ([brake-bands, brake-shoes, brake-drums F16D65/00](#))
 - F16D13/64 . . . Clutch-plates; Clutch-lamellae ([brake-plates, brake-lamellae F16D65/12](#))
 - F16D13/64B [N: Hub construction]
 - F16D13/64B2 [N: Mounting of the discs on the hub]
 - F16D13/64C [N: for clutches with multiple lamellae]
 - F16D13/66 of conical shape
 - F16D13/68 Attachments of plates or lamellae to their supports [N: (one or more discs connected to the linings transmitting torque to one or more discs connected to the hub by helical springs in windows in the discs, i.e. rotary vibration dampers [F16F15/12](#))]
 - F16D13/68B [N: for clutches with multiple lamellae]
 - F16D13/68D [N: with one or more intermediate members made of rubber or like material transmitting torque from the linings to the hub]
 - F16D13/69 Arrangements for spreading lamellae in the released state [[N1204](#)]
 - F16D13/70 . . Pressure members, e.g. pressure plates, for clutch-plates or lamellae; Guiding arrangements for pressure members [N: ([clutch flywheels comprising two or more masses with a rotational damper F16F15/12K](#))]
 - F16D13/71 . . . in which the clutching pressure is produced by springs only
 - F16D13/72 . . Features relating to cooling

- F16D13/74 . . Features relating to lubrication
- F16D13/75 . . Features relating to adjustment, e.g. slack adjusters
- F16D13/75B . . . [N: the adjusting device being located in the actuating mechanism arranged outside the clutch (adjusting "Bowden" mechanisms [F16C1/22](#))]
- F16D13/75C . . . [N: the adjusting device being located in or near the release bearing]
- F16D13/75D . . . [N: the adjusting device being located on or inside the clutch cover, e.g. acting on the diaphragm or on the pressure plate]

- F16D13/76 . specially adapted to incorporate with other transmission parts, i.e. at least one of the clutch parts also having another function, e.g. being the disc of a pulley

- F16D15/00** **Clutches with wedging balls or rollers or with other wedgeable separate clutching members** ([freewheels, freewheel clutches F16D41/00](#))

- F16D17/00** **Clutches in which the drive is transmitted solely by virtue of the eccentricity of the contacting surfaces of clutch members which fit one around the other**

- F16D19/00** **Clutches with mechanically-actuated clutching members not otherwise provided for**

- F16D21/00** **Systems comprising a plurality of actuated clutches** ([for synchronisation F16D23/04](#)) [\[C1207\]](#)
- F16D21/02 . for interconnecting three or more shafts or other transmission members in different ways ([in endless-track vehicles B62D](#))
- F16D21/04 . . with a shaft carrying a number of rotatable transmission members, e.g. gears, each of which can be connected to the shaft by a clutching member or members between the shaft and the hub of the transmission member
- F16D21/06 . . at least two driving shafts or two driven shafts being concentric
- F16D21/08 . Serially-arranged clutches interconnecting two shafts only when all the clutches are engaged ([F16D13/08, F16D13/12 take precedence](#))

- F16D23/00** **Details of mechanically-actuated clutches not specific for one distinct type**
- F16D23/02 . Arrangements for synchronisation, also for power-operated clutches ([shape or mounting of interengaging parts of clutch members to facilitate engagement F16D11/08](#))
- F16D23/02R . . Synchro rings [\[N9905\]](#)
- F16D23/04 . . with an additional friction clutch ([synchro rings per se F16D23/02R](#)) [\[C9905\]](#)
- F16D23/06 . . . and a blocking mechanism preventing the engagement of the main clutch prior to synchronisation
- F16D23/06B [N: the blocking mechanism comprising an axially-extending shouldered pin passing through a hole in a radial wall]
- F16D23/06C [N: the blocking mechanism comprising a radial pin in an axial slot with at least one branch]
- F16D23/08 . . with a blocking mechanism that only releases the clutching member on synchronisation ([in combination with an additional friction clutch F16D23/06](#))

- F16D23/10 . . . automatically producing the engagement of the clutch when the clutch members are moving at the same speed; Indicating synchronisation
- F16D23/12 . . Mechanical clutch-actuating mechanisms arranged outside the clutch as such (specific for combined clutches [F16D21/00](#); mechanisms specific for synchronisation [F16D23/02](#))
- F16D23/14 . . . Clutch-actuating sleeves [N: or bearings]; Actuating members directly connected to clutch-actuating sleeves[N: or bearings]
- F16D23/14C [N: with a resilient member acting radially between the bearing and its guide means]
- F16D23/14D [N: Arrangements or details for the connection between the release bearing and the diaphragm]
- F16D23/14D2 [N: With a disengaging thrust-ring distinct from the release bearing, and secured to the diaphragm]
- F16D23/14D2B [N: Arrangements for the connection between the thrust-ring and the diaphragm]
- F16D23/14D2C [N: Arrangements for the connection between the thrust-ring and the release bearing]
- F16D23/14P [N: bearing with rolling elements having at least one race or part fixed to the race blind axially, e.g. cup-shaped]
- F16D23/14T [N: Guide-sleeve receiving the clutch release bearing]

Guide heading: **Clutches actuated non-mechanically** (arrangements for synchronisation [F16D23/02](#); fluid clutches [F16DE31/00](#) to [F16D39/00](#); automatic clutches [F16D41/00](#) to [F16D45/00](#); dynamo-electric clutches [H02K49/00](#); clutches using electrostatic attraction [H02N13/00](#))

F16D25/00 Fluid-actuated clutches

- F16D25/02 . . with means for actuating or keeping engaged by a force derived at least partially from one of the shafts to be connected
- F16D25/04 . . in which the fluid actuates an elastic clutching, [N: i.e. elastic actuating] member, e.g. a diaphragm or a pneumatic tube ([F16D25/02](#) takes precedence; coupling using a pneumatic tube [F16D3/82](#))
- F16D25/04B . . . [N: the elastic actuating member rotating with the clutch]
- F16D25/04B2 [N: and causing purely axial movement]
- F16D25/04B3 [N: and causing purely radial movement]
- F16D25/04C . . . [N: the elastic actuating member not rotating with a coupling part]
- F16D25/06 . . in which the fluid actuates a piston incorporated in, [N: i.e. rotating with] the clutch ([F16D25/02](#) takes precedence)
- F16D25/061 . . . the clutch having interengaging clutch members
- F16D25/062 . . . the clutch having friction surfaces
- F16D25/063 with clutch members exclusively moving axially
- F16D25/0632 with conical friction surfaces, e.g. cone clutches
- F16D25/0635 with flat friction surfaces, e.g. discs
- F16D25/0638 with more than two discs, e.g. multiple lamellae
- F16D25/064 the friction surface being grooved

- F16D25/065
 - • • with clutching members having a movement which has at least a radial component
- F16D25/08
 - with fluid-actuated member not rotating with a clutching member ([F16D25/02](#) takes precedence) [N: [F16D25/04C](#) takes precedence]
- F16D25/08B
 - • [N: the line of action of the fluid-actuated members co-inciding with the axis of rotation]
- F16D25/08B1
 - • • [N: Actuators therefor ([F16D25/08B2](#) to [F16D25/08B4](#) take precedence)] [N9909]
- F16D25/08B2
 - • • [N: the clutch actuation being of the pull type]
- F16D25/08B3
 - • • [N: the clutch being actuated by a push rod extending coaxially through the input or output shaft]
- F16D25/08B4
 - • • [N: the clutch being actuated by the fluid-actuated member via a diaphragm spring or an equivalent array of levers ([F16D25/08B2](#), [F16D25/08B3](#) take precedence)] [N9909]
- F16D25/08C
 - • [N: the line of action of the fluid-actuated members being distinctly separate from the axis of rotation]
- F16D25/10
 - Clutch systems with a plurality of fluid-actuated clutches ([arrangements or mounting of clutches in vehicles B60K17/00](#))
- F16D25/12
 - Details not specific to one of the before-mentioned types
- F16D25/12C
 - • [N: in view of cooling and lubrication]
- F16D25/12F
 - • [N: adjustment for wear or play]
- F16D25/14
 - • [N: IPC5] Fluid pressure control
- F16D27/00**
Magnetically-[N: or electrically-]actuated clutches; Control or electric circuits therefor (clutches with magnetisable particles [F16D37/02](#); [N: with electro-rheological fluids [F16D37/00R](#)])
- F16D27/00C
 - [N: with permanent magnets combined with electromagnets]
- F16D27/01
 - with permanent magnets
- F16D27/02
 - with electromagnets incorporated in the clutch, i.e. with collecting rings [N: ([F16D27/00C](#) takes precedence)]
- F16D27/02C
 - • [N: and with a helical band or equivalent member co-operating with a cylindrical coupling surface]
- F16D27/04
 - • with axially-movable friction surfaces
- F16D27/06
 - • • with friction surfaces arranged within the flux
- F16D27/08
 - • • with friction surfaces arranged externally to the flux
- F16D27/09
 - • and with interengaging jaws or gear-teeth
- F16D27/10
 - with an electromagnet not rotating with a clutching member, i.e. without collecting rings [N: ([F16D27/00C](#) takes precedence)]
- F16D27/102
 - • with radially movable clutching members ([F16D27/105](#) takes precedence)
- F16D27/105
 - • with a helical band or equivalent member co-operating with a cylindrical coupling surface
- F16D27/108
 - • with axially movable clutching members

F16D27/11	<ul style="list-style-type: none"> with conical friction surfaces, e.g. cone clutches
F16D27/112	<ul style="list-style-type: none"> with flat friction surfaces, e.g. discs
F16D27/115	<ul style="list-style-type: none"> with more than two discs, e.g. multiple lamellae
F16D27/118	<ul style="list-style-type: none"> with interengaging jaws or gear teeth
F16D27/12	<ul style="list-style-type: none"> Clutch systems with a plurality of electro-magnetically-actuated clutches [N: (F16D27/00C takes precedence)]
F16D27/14	<ul style="list-style-type: none"> Details
F16D28/00	Electrically-actuated clutches (arrangements for synchronisation F16D23/02; clutches actuated directly by means of an electromagnet F16D27/00; automatic clutches F16D43/00 to F16D45/00; external control F16D48/00) [N1204]
F16D29/00	Clutches and systems of clutches involving both fluid and magnetic actuation
F16D29/00B	<ul style="list-style-type: none"> [N: with a fluid pressure piston driven by an electric motor] [N9908]
Guide heading:	<u>Couplings or clutches with a fluid or a semi-fluid as a power-transmitting means (fluid gearing F16H39/00 to F16H49/00)</u>
F16D31/00	Fluid couplings or clutches with pumping sets of the volumetric type, i.e. in the case of liquid passing a predetermined volume per revolution
F16D31/02	<ul style="list-style-type: none"> using pumps with pistons or plungers working in cylinders
F16D31/04	<ul style="list-style-type: none"> using gear-pumps
F16D31/06	<ul style="list-style-type: none"> using pumps of types differing from those before-mentioned
F16D31/08	<ul style="list-style-type: none"> Control of slip
F16D33/00	Rotary fluid couplings or clutches of the hydro-kinetic type
F16D33/02	<ul style="list-style-type: none"> controlled by changing the flow of the liquid in the working circuit, while maintaining a completely filled working circuit
F16D33/04	<ul style="list-style-type: none"> by altering the position of blades
F16D33/06	<ul style="list-style-type: none"> controlled by changing the amount of liquid in the working circuit
F16D33/08	<ul style="list-style-type: none"> by devices incorporated in the fluid coupling, with or without remote control
F16D33/10	<ul style="list-style-type: none"> consisting of controllable supply and discharge openings
F16D33/12	<ul style="list-style-type: none"> controlled automatically by self-actuated valves
F16D33/14	<ul style="list-style-type: none"> consisting of shiftable or adjustable scoops
F16D33/16	<ul style="list-style-type: none"> by means arranged externally of the coupling or clutch (mounting of such means in vehicles B60K23/00, e.g. B60K23/02)
F16D33/18	<ul style="list-style-type: none"> Details (applicable also to fluid gearing F16H41/24)

- F16D33/20 . . Shape of wheels, blades, or channels with respect to function
- F16D35/00** **Fluid clutches in which the clutching is predominantly obtained by fluid adhesion**
(F16D37/00 takes precedence) [N: (arrangements of viscous clutches in four-wheel drives - B60K17/346B1 and B60K17/35B1)]
- F16D35/00B . [N: with multiple lamellae]
- F16D35/02 . with rotary working chambers and rotary reservoirs, e.g. in one coupling part
- F16D35/02B . . [N: actuated by valves] [N0008]
- F16D35/02B2 . . . [N: the valve being actuated by a bimetallic strip (F16D35/02B9 takes precedence)] [N0008]
- F16D35/02B3 . . . [N: the valve being actuated by a bimetallic coil (F16D35/02B9 takes precedence)] [N0008]
- F16D35/02B4 . . . [N: the valve being actuated electrically, e.g. by an electromagnet (F16D35/02B9 takes precedence)] [N0008]
- F16D35/02B6 . . . [N: the valve being actuated by inertia, e.g. using a flyweight or a centrifugal mass (F16D35/02B9 takes precedence)] [N0008]
- F16D35/02B9 . . . [N: actuated by a plurality of valves; the valves being actuated by a combination of mechanisms covered by more than one of groups F16D35/02B2 to F16D35/02B6] [N0008]
- F16D35/02F . . [N: actuated by emptying and filling with viscous fluid from outside the coupling during operation] [N0008]
- F16D35/02H . . [N: actuated electrically, e.g. by an electromagnet (valves actuated electrically F16D35/02B4)] [N0008]
- F16D35/02R . . [N: actuated by varying the volume of the reservoir chamber] [N0008]
- F16D37/00** **Clutches in which the drive is transmitted through a medium consisting of small particles, e.g. centrifugally speed-responsive**
- F16D37/00R . [N: the particles being carried by a fluid, to vary viscosity when subjected to electric change, i.e. electro-rheological or smart fluids (composition of such fluids C10M171/00B)]
- F16D37/02 . the particles being magnetisable
- F16D39/00** **Combinations of couplings according to two or more of the groups F16D31/00 to F16D37/00**
- Guide heading:** **Freewheels or freewheel clutches; Automatic clutches** (F16D31/00 to F16D39/00 take precedence)
- F16D41/00** **Freewheels or freewheel clutches** (cycle brakes controlled by back-pedalling B62L5/00; [N: one-way linear clutches F16B7/16])
- F16D41/02 . disengaged by contact of a part of or on the freewheel or freewheel clutch with a stationarily-mounted member
- F16D41/04 . combined with a clutch for locking the driving and driven members (F16D41/02,

F16D41/24 take precedence)

- F16D41/06 . with intermediate wedging coupling members between an inner and an outer surface (F16D41/02, F16D41/24 take precedence)
- F16D41/061 . . the intermediate members wedging by movement having an axial component [N1203]
- F16D41/063 . . the intermediate members wedging by moving along the inner and the outer surface without pivoting or rolling, e.g. sliding wedges (F16D41/061 takes precedence) [N1204]
- F16D41/064 . . the intermediate members wedging by rolling and having a circular cross-section, e.g. balls (F16D41/061 takes precedence) [N1204]
- F16D41/066 . . . all members having the same size and only one of the two surfaces being cylindrical [N1203]
- F16D41/067 and the members being distributed by a separate cage encircling the axis of rotation [N1203]
- F16D41/069 . . the intermediate members wedging by pivoting or rocking, e.g. sprags (F16D41/061 takes precedence) [N1204]
- F16D41/07 . . . between two cylindrical surfaces
- F16D41/07B [N: each member comprising at least two elements at different radii]
- F16D41/07C [N: the wedging coupling members being non-releasably joined to form a single annular piece, e.g. either the members being integral projections from the piece, or the piece being an elastic ring cast round the radial centres of the members]
- F16D41/08 . . with provision for altering the freewheeling action
- F16D41/08B . . . [N: the intermediate coupling members wedging by movement other than pivoting or rolling]
- F16D41/08C . . . [N: the intermediate coupling members wedging by pivoting or rocking]
- F16D41/08D . . . [N: the intermediate members being of circular cross-section and wedging by rolling (F16D41/10 takes precedence)]
- F16D41/08D2 [N: the intermediate members being of only one size and wedging by a movement not having an axial component, between inner and outer races, one of which is cylindrical]
- F16D41/10 . . . with self-actuated reversing
- F16D41/10B [N: the intermediate members being of circular cross-section, of only one size and wedging by rolling movement not having an axial component between inner and outer races, one of which is cylindrical]
- F16D41/12 . with hinged pawl co-operating with teeth, cogs, or the like (F16D41/02, F16D41/24 take precedence)
- F16D41/12B . . [N: the pawl movement having an axial component] [N0011]
- F16D41/14 . . the effective stroke of the pawl being adjustable
- F16D41/16 . . the action being reversible
- F16D41/18 . with non-hinged detent (F16D41/02, F16D41/24 take precedence)
- F16D41/18B . . [N: the engaging movement having an axial component] [N0011]
- F16D41/20 . with expandable or contractable clamping ring or band (F16D41/02, F16D41/24 take precedence)
- F16D41/20B . . [N: having coils overlapping in a single radial plane, e.g. Archimedian spiral]

- F16D41/20C . . [N: having axially adjacent coils, e.g. helical wrap-springs]
- F16D41/22 . with clutching ring or disc axially shifted as a result of lost motion between actuating members ([F16D41/02](#), [F16D41/24](#) take precedence)
- F16D41/24 . specially adapted for cycles
- F16D41/26 . . with provision for altering the action
- F16D41/28 . . with intermediate wedging coupling members
- F16D41/30 . . with hinged pawl co-operating with teeth, cogs, or the like
- F16D41/32 . . with non-hinged detent
- F16D41/34 . . with expandable or contractable clamping ring or band
- F16D41/36 . . with clutching ring or disc axially shifted as a result of lost motion between actuating members

- F16D43/00** **Automatic clutches** (varying the relationship between two coaxial shafts [F16D3/10](#); freewheels, freewheel clutches [F16D41/00](#))
- F16D43/02 . actuated entirely mechanically
- F16D43/04 . . controlled by angular speed ([F16D43/24](#) takes precedence; clutches in which the drive is transmitted through a medium consisting of small particles [F16D37/00](#))
- F16D43/06 . . . with centrifugal masses actuating axially a movable pressure ring or the like
- F16D43/08 the pressure ring actuating friction plates, cones or similar axially-movable friction surfaces
- F16D43/09 in which the carrier of the centrifugal masses can be stopped
- F16D43/10 the centrifugal masses acting directly on the pressure ring, no other actuating mechanism for the pressure ring being provided
- F16D43/12 the centrifugal masses acting on, or forming a part of, an actuating mechanism by which the pressure ring can also be actuated independently of the masses
- F16D43/14 . . . with centrifugal masses actuating the clutching members directly in a direction which has at least a radial component; with centrifugal masses themselves being the clutching members
- F16D43/16 with clutching members having interengaging parts
- F16D43/18 with friction clutching members
- F16D43/20 . . controlled by torque, e.g. overload-release clutches, slip-clutches with means by which torque varies the clutching pressure
- F16D43/202 . . . of the ratchet type (slip couplings of the ratchet type [F16D7/04](#))
- F16D43/202B [N: with at least one part moving axially between engagement and disengagement ([F16D43/206](#) takes precedence)]
- F16D43/202B2 [N: the axially moving part being coaxial with the rotation, e.g. a gear with face teeth]
- F16D43/202B3 [N: with a plurality of axially moving parts]
- F16D43/202C [N: with at least one part moving radially between engagement and disengagement ([F16D43/208](#) takes precedence)]
- F16D43/204 with intermediate balls or rollers
- F16D43/206 moving axially between engagement and disengagement
- F16D43/208 moving radially between engagement and disengagement

- F16D43/21 . . . with friction members ([N: slip couplings of the friction type [F16D7/02](#)])
- F16D43/21B [N: with radially applied torque-limiting friction surfaces]
- F16D43/21D [N: with axially applied torque-limiting friction surfaces]
- F16D43/21D2 [N: with flat friction surfaces, e.g. discs]
- F16D43/21D2B [N: with multiple lamellae]
- F16D43/21D3 [N: with conical friction surfaces]
- F16D43/22 . . controlled by both speed and torque
- F16D43/24 . . controlled by acceleration or deceleration of angular speed
- F16D43/25 . . controlled by thermo-responsive elements
- F16D43/26 . . acting at definite angular position or disengaging after [N: consecutive] definite number of rotations (actuating by means of stationary abutment [F16D11/02](#), [F16D13/02](#), [F16D15/00](#); control of change-speed or reversing-gearings conveying rotary motion [F16H59/00](#) to [F16H63/00](#))

- F16D43/28 . . actuated by fluid pressure
- F16D43/284 . . . controlled by angular speed
- F16D43/286 . . . controlled by torque

- F16D43/30 . . Systems of a plurality of automatic clutches

F16D45/00 Freewheel or freewheel clutches combined with automatic clutches

F16D47/00 Systems of clutches, or clutches and couplings, comprising devices of types grouped under at least two of the preceding guide headings

- F16D47/02 . . of which at least one is a coupling (elastic attachment of clutch parts, see the groups for the clutches) [N: (clutch flywheels with damping devices [F16D15/10+s.gr.](#))]
- F16D47/04 . . of which at least one is a freewheel ([F16D47/02](#), [F16D47/06](#) take precedence; freewheels combined with a clutch to lock the driving and driven members of the freewheel [F16D41/04](#), [F16D41/26](#))
- F16D47/06 . . of which at least one is a clutch with a fluid or a semi-fluid as power-transmitting means

F16D48/00 External control of clutches [N9809]

[N: WARNING]

Groups [F16D48/00](#), [F16D48/06](#), [F16D48/08](#), [F16D48/10](#), introduced in September 1998, are not complete. Documents from the groups [F16D48/06B](#) to [F16D48/06H](#) are in the process of being reorganised to [F16D48/00](#), [F16D48/08](#), [F16D48/10](#)]

- F16D48/02 . . Control by fluid pressure[N0409]
- F16D48/02B . . . [N: in a system with a plurality of fluid-actuated clutches] [N0505]
- F16D48/04 . . . providing power assistance[N0409]

- F16D48/06 . . Control by electric or electronic means, e.g. of fluid pressure [N9809]

- F16D48/06B . . [N: of a clutch system with a plurality of fluid actuated clutches] [N9809]
- F16D48/06E . . [N: Control of electrically or electromagnetically actuated clutches ([F16D48/06B](#), [F16D48/06T](#) take precedence)] [N9809]
- F16D48/06H . . [N: Control of fluid pressure, e.g. using an accumulator ([F16D48/06B](#), [F16D48/06T](#) take precedence)] [N9809]
- F16D48/06T . . [N: using signals from a manually actuated gearshift linkage] [N9809]
- F16D48/08 . . Regulating clutch take-up on starting [N9809]
- F16D48/10 . . Preventing unintentional or unsafe engagement [N9809]

Guide heading: **Brakes** ([electrodynamic brake systems for vehicles in general B60L](#); [dynamo-electric brakes H02K](#))

F16D49/00 **Brakes with a braking member co-operating with the periphery of a drum, wheel-rim, or the like** ([similar clutches F16D13/10](#))

- F16D49/02 . . shaped as a helical band or coil with more than one turn, with or without intensification of the braking force by the tension of the band or contracting member ([similar clutches F16D13/08](#))
- F16D49/04 . . mechanically actuated
- F16D49/06 . . fluid actuated
- F16D49/08 . . shaped as an encircling band extending over approximately 360 degrees
- F16D49/10 . . mechanically actuated ([self-tightening F16D49/20](#))
- F16D49/12 . . fluid actuated
- F16D49/14 . . shaped as a fluid-filled flexible member actuated by variation of the fluid pressure
- F16D49/16 . . Brakes with two brake-blocks ([self-tightening F16D49/20](#))
- F16D49/18 . . Brakes with three or more brake-blocks ([self-tightening F16D49/20](#))
- F16D49/20 . . Self-tightening brakes ([with helical or coil with more than one turn F16D49/02](#))
- F16D49/22 . . with an auxiliary friction member initiating or increasing the action of the brake

F16D51/00 **Brakes with outwardly-movable braking members co-operating with the inner surface of a drum or the like** ([similar clutches F16D13/14](#))

- F16D51/02 . . shaped as one or more circumferential band ([similar clutches F16D13/12](#))
- F16D51/04 . . mechanically actuated
- F16D51/06 . . fluid actuated
- F16D51/08 . . shaped as an expansible fluid-filled flexible member
- F16D51/10 . . shaped as exclusively radially-movable brake-shoes
- F16D51/12 . . mechanically actuated
- F16D51/14 . . fluid actuated
- F16D51/16 . . shaped as brake-shoes pivoted on a fixed or nearly-fixed axis [C1203]

- F16D51/18 . . with two brake-shoes
- F16D51/20 . . . extending in opposite directions from their pivots
- F16D51/22 mechanically actuated
- F16D51/24 fluid actuated
- F16D51/26 . . . both extending in the same direction from their pivots
- F16D51/28 mechanically actuated
- F16D51/30 fluid actuated
- F16D51/32 . . with three or more brake shoes
- F16D51/34 . . . extending in opposite directions from their pivots
- F16D51/36 mechanically actuated
- F16D51/38 fluid actuated
- F16D51/40 . . . all extending in the same direction from their pivots
- F16D51/42 mechanically actuated
- F16D51/44 fluid actuated

- F16D51/46 . Self-tightening brakes with pivoted brake shoes, [N: i.e. the braked member increases the braking action]
- F16D51/48 . . with two linked or directly-interacting brake shoes
- F16D51/50 . . . mechanically actuated
- F16D51/52 . . . fluid actuated
- F16D51/54 . . with three or more brake-shoes, at least two of them being linked or directly interacting
- F16D51/56 . . . mechanically actuated
- F16D51/58 . . . fluid actuated
- F16D51/60 . . with wedging action of a brake-shoe, e.g. the shoe entering as a wedge between the brake-drum and a stationary part
- F16D51/62 . . . mechanically actuated
- F16D51/64 . . . fluid actuated
- F16D51/66 . . an actuated brake-shoe being carried along and thereby engaging a member for actuating another brake-shoe
- F16D51/68 . . . mechanically actuated
- F16D51/70 . . . fluid actuated

- F16D53/00** **Brakes with braking members co-operating with both the periphery and the inner surface of a drum, wheel-rim, or the like (similar clutches [F16D13/20](#))**

- F16D55/00** **Brakes with substantially-radial braking surfaces pressed together in axial direction, e.g. disc brakes (similar clutches [F16D13/38](#))**

- F16D55/02 . with axially-movable discs or pads pressed against axially-located rotating members
- F16D55/02B . . [N: with two or more rotating discs at least one of them being located axially]
- F16D55/04 . . by moving discs or pads away from one another against radial walls of drums or cylinders
- F16D55/06 . . . without self-tightening action

F16D55/08	. . . .	Mechanically-actuated brakes
F16D55/10	. . . .	Brakes actuated by a fluid-pressure device arranged in or on the brake
F16D55/12	. . . . .	comprising an expansible fluid-filled flexible member coaxial with the brake
F16D55/14	. . . .	with self-tightening action, e.g. by means of coacting helical surfaces or balls and inclined surfaces
F16D55/15	. . . .	initiated by means of brake-bands or brake-shoes
F16D55/16	. . . .	Mechanically-actuated brakes
F16D55/18	. . . .	Brakes actuated by a fluid-pressure device arranged in or on the brake
F16D55/20	. . . . .	comprising an expansible fluid-filled flexible member coaxial with the brake
F16D55/22	. . . .	by clamping an axially-located rotating disc between movable braking members, e.g. movable brake discs or brake pads
F16D55/224	. . . .	with a common actuating member for the braking members
F16D55/224B	. . . .	[N: in which the common actuating member acts on two levers carrying the braking members, e.g. tong-type brakes (similar brakes for rail vehicles B61H5/00)] [N9610]
F16D55/225	. . . .	the braking members being brake pads
F16D55/2255	. . . . .	in which the common actuating member is pivoted
F16D55/226	. . . . .	in which the common actuating member is moved axially, [N: e.g. floating caliper disc brakes] [C0011]
F16D55/226H	. . . . .	[N: the axial movement being guided by open sliding surfaces, e.g. grooves] [N9712] [C0011]
F16D55/2265	. . . . .	the axial movement being guided by one or more pins [N: engaging bores in the brake support or the brake housing] [C0011]
F16D55/2265F	. . . . .	{7 dots} [N: Constructional details of guide pins] [N9712]
F16D55/227	. . . . .	{7 dots} by two [N: or more] pins [C9712]
F16D55/228	. . . .	with a separate actuating member for each side
F16D55/24	. . . .	with a plurality of axially-movable discs, lamellae, or pads, pressed from one side towards an axially-located member
F16D55/26	. . . .	without self-tightening action
F16D55/28	. . . .	Brakes with only one rotating disc
F16D55/30	. . . .	mechanically actuated
F16D55/31	. . . . .	by means of an intermediate leverage
F16D55/32	. . . .	actuated by a fluid-pressure device arranged in or on the brake
F16D55/33	. . . . .	by means of an intermediate leverage
F16D55/34	. . . . .	comprising an expansible fluid-filled flexible member coaxial with the brake
F16D55/36	. . . .	Brakes with a plurality of rotating discs all lying side by side
F16D55/38	. . . .	mechanically actuated
F16D55/39	. . . . .	by means of an intermediate leverage
F16D55/40	. . . .	actuated by a fluid-pressure device arranged in or one the brake
F16D55/41	. . . . .	by means of an intermediate leverage
F16D55/42	. . . . .	comprising an expansible fluid-filled flexible member coaxial with the brake

- F16D55/44 . . . with the rotating part consisting of both central plates and ring-shaped plates arranged concentrically around the central plates
- F16D55/46 . . with self-tightening action
- F16D55/48 . . . with discs or pads having a small free angular travel relative to their support, which produces the self-tightening action
- F16D55/50 . . . with auxiliary friction members, which may be of different type, producing the self-tightening action

- F16D57/00** **Liquid-resistance brakes; [N: Brakes using the internal friction of fluids or fluid-like media, e.g. powders (for braking drums, barrels or ropes of cranes, lift hoists or winches B66D5/02B)] [C1107]**
- F16D57/00B . [N: comprising a medium with electrically or magnetically controlled internal friction, e.g. electrorheological fluid, magnetic powder] [N1107]
- F16D57/00D . [N: Details of blades, e.g. shape] [N1107]
- F16D57/00E . [N: with variable brake geometry, e.g. axially movable rotor or stator] [N1107]
- F16D57/02 . with blades or like members braked by the fluid
- F16D57/04 . with blades causing a directed flow, e.g. Föttinger type
- F16D57/06 . comprising a pump circulating fluid, braking being effected by throttling of the circulation

- F16D59/00** **Self-acting brakes, e.g. coming into operation at a predetermined speed**
- F16D59/02 . spring-loaded and adapted to be released by mechanical, fluid, or electromagnetic means

- F16D61/00** **Brakes with means for making the energy absorbed available for use (F16D57/00 takes precedence)**

- F16D63/00** **Brakes not otherwise provided for; Brakes combining more than one of the types of groups F16D49/00-F16D61/00 [C1203]**
- F16D63/00B . [N: Brakes with direct electrical or electro-magnetic actuation] [C0011]
- F16D63/00F . [N: comprising a rotor engaged both axially and radially by braking members, e.g. combined drum and disc brakes] [N9611]
- F16D63/00H . [N: Positive locking brakes] [N0012]
- F16D63/00J . [N: Brakes acting on a linearly moving member] [N0012]

- F16D65/00** **Parts or details (similar members for clutches F16D13/58)**
- F16D65/00A . [N: Noise or vibration control] [N0312]

F16D65/00A1	. . [N: Active vibration dampers] [N0312]
F16D65/00A2	. . [N: Dynamic vibration dampers, e.g. mass-spring systems] [N0312]
F16D65/00C	. [N: Rust- or corrosion-preventing means] [N0312]
F16D65/00D	. [N: Devices for retaining friction material debris, e.g. dust collectors or filters] [N0312]
F16D65/00E	. [N: Devices for conditioning friction surfaces, e.g. cleaning or abrasive elements] [N0312]
F16D65/00F	. [N: Brake maintenance and assembly, tools therefor] [N0312]
F16D65/00H	. [N: Components of axially engaging brakes not otherwise provided for] [N1107]
F16D65/00H2	. . [N: Brake supports] [N1107]
F16D65/00H2B	. . . [N: integral with vehicle suspension, e.g. with the steering knuckle] [N1107]
F16D65/00H4	. . [N: Brake calipers] [N1107]
F16D65/00H4B	. . . [N: assembled from a plurality of parts] [N1107]
F16D65/00H6	. . [N: Brake covers] [N1107]
F16D65/00H8	. . [N: Brake housing guide members, e.g. caliper pins; Accessories therefor, e.g. dust boots] [N1107]
F16D65/00H10	. . [N: Brake housing guide members, e.g. caliper pins; Accessories therefor, e.g. dust boots] [N1107]
F16D65/02	. Braking members; Mounting thereof (friction linings or attachment thereof F16D69/00)
F16D65/02D	. . [N: Rollers] [N1107]
F16D65/04	. . Bands, shoes or pads; Pivots or supporting members therefor
F16D65/06	. . . for externally-engaging brakes
F16D65/06B	. . . . [N: engaging the tread of a railway wheel] [N1107]
F16D65/06F	. . . . [N: Brake bands] [N1107]
F16D65/06F2	. . . . . [N: with means for mounting, e.g. end connection members] [N1107]
F16D65/08	. . . for internally-engaging brakes
F16D65/09	. . . . Pivots or supporting members therefor
F16D65/09B	. . . . . [N: for axially holding the segments]
F16D65/092	. . . for axially-engaging brakes, e.g. disc brakes
F16D65/095	. . . . Pivots or supporting members therefor
F16D65/097	. . . . . Resilient means interposed between pads and supporting members [N: or other brake parts] [C9610]
F16D65/097B	. . . . . [N: transmitting brake actuation force, e.g. elements interposed between brake piston and pad] [N9610]
F16D65/097D	. . . . . [N: transmitting brake reaction force, e.g. elements interposed between torque support plate and pad] [N9610]
F16D65/097F	. . . . . [N: not subjected to brake forces] [N9610]
F16D65/097F2	. . . . . {7 dots} [N: acting on or in the vicinity of the pad rim in a direction substantially transverse to the brake disc axis] [N9610]
F16D65/097F2B	. . . . . {8 dots} [N: Springs made from wire] [N9610]
F16D65/097F2B2	. . . . . {9 dots} [N: acting on one pad only] [N9610]

F16D65/097F2D	. . . . . {8 dots} [N: Springs made from sheet metal] [N9610]
F16D65/097F2D2	. . . . . {9 dots} [N: acting on one pad only] [N9610]
F16D65/097F4	. . . . . {7 dots} [N: acting on the rear side of the pad or an element affixed thereto, e.g. spring clips securing the pad to the brake piston or caliper] [N9610]
F16D65/10	. . Drums for externally- or internally-engaging brakes
F16D65/12	. . Discs; Drums for disc brakes
F16D65/12B	. . . [N: consisting of at least three circumferentially arranged segments] [N9505]
F16D65/12C	. . . [N: adapted for mounting of friction pads] [N9505]
F16D65/12D	. . . [N: comprising an annular disc secured to a hub member; Discs characterised by means for mounting] [N9505] [C0011]
F16D65/12D2	. . . . [N: adapted for mounting on the wheel of a railway vehicle] [N9505]
F16D65/12F	. . . [N: characterised by the material used for the disc body] [N9505] [C0011]
F16D65/12F2	. . . . [N: the material being of low mechanical strength, e.g. carbon, beryllium; Torque transmitting members therefor] [N9505]
F16D65/12G	. . . [N: characterised by properties of the disc surface; Discs lined with friction material] [N9505]
F16D65/12H	. . . [N: characterised by means for cooling] [N9505] [C0011]
F16D65/14	. Actuating mechanisms for brakes; Means for initiating operation at a predetermined position (brake control systems, parts thereof B60T)
	[N: Note [N0310]Subgroups F16D65/16 to F16D65/36 are no longer used for classification, documents in these groups are being transferred to groups F16D65/14B to F16D65/14P]
F16D65/16	. . arranged in or on the brake
F16D65/18	. . . adapted for drawing members together, [N: e.g. for disc brakes] [C1203]
F16D65/18B	. . . . [N: with force-transmitting members arranged side by side acting on a spot type force-applying member] [N1203]
F16D65/18D	. . . . [N: with full-face force-applying member, e.g. annular] [N1203]
F16D65/22	. . . adapted for pressing members apart, [N: e.g. for drum brakes] [C1203]
F16D65/28	. . arranged apart from the brake
F16D65/38	. Slack adjusters
F16D65/40	. . mechanical
F16D65/42	. . . non-automatic
F16D65/44	. . . . by means of direct linear adjustment [C1203]
F16D65/46	. . . . with screw-thread and nut
F16D65/48	. . . . with eccentric or helical body
F16D65/50	. . . . for angular adjustment of two concentric parts of the brake control system
F16D65/52	. . . self-acting in one direction for adjusting excessive play
F16D65/54	. . . . by means of direct linear adjustment [C1203]
F16D65/54B	. . . . . [N: comprising a plastically-deformable member] [N9601]
F16D65/54D	. . . . . [N: for mounting within the confines of a drum brake] [N9602] [C0011]
F16D65/56	. . . . with screw-thread and nut

F16D65/56B	. . . . .	[N: for mounting within the confines of a drum brake] [N9409]
F16D65/56B2	. . . . .	[N: arranged between service brake actuator and braking member, and subjected to service brake force] [N9409]
F16D65/56B4	. . . . .	[N: arranged adjacent to service brake actuator, e.g. on parking brake lever, and not subjected to service brake force] [N9409]
F16D65/56B6	. . . . .	[N: arranged diametrically opposite to service brake actuator, and subjected to service brake force] [N9409]
F16D65/56B8	. . . . .	[N: having a temperature-sensitive element preventing adjustment when brake is hot] [N9409]
F16D65/56D	. . . . .	[N: for mounting on a disc brake] [N9409]
F16D65/56D2	. . . . .	[N: for synchronous adjustment of actuators arranged in parallel] [N9409]
F16D65/58	. . . . .	with eccentric or helical body
F16D65/60	. . . . .	for angular adjustment of two concentric parts of the brake control systems
F16D65/62	. . . . .	self-acting in both directions for adjusting excessive and insufficient play
F16D65/64	. . . . .	by means of direct linear adjustment [C1203]
F16D65/66	. . . . .	with screw-thread and nut
F16D65/68	. . . . .	with eccentric or helical body
F16D65/70	. . . . .	for angular adjustment of two concentric parts of the brake control system
F16D65/72	. . . . .	hydraulic
F16D65/74	. . . . .	self-acting in one direction
F16D65/76	. . . . .	self-acting in both directions
F16D65/78	. . . . .	Features relating to cooling
F16D65/80	. . . . .	for externally-engaging brakes
F16D65/807	. . . . .	with open cooling system, e.g. cooled by air
F16D65/813	. . . . .	with closed cooling system
F16D65/82	. . . . .	for internally-engaging brakes
F16D65/827	. . . . .	with open cooling system, e.g. cooled by air
F16D65/833	. . . . .	with closed cooling system
F16D65/84	. . . . .	for disc brakes [N: (discs characterised by means for cooling F16D65/12H)] [C9505]
F16D65/847	. . . . .	with open cooling system, e.g. cooled by air
F16D65/853	. . . . .	with closed cooling system

F16D66/00**Arrangements for monitoring working conditions, e.g. wear, temperature**

F16D66/02	. . . . .	Apparatus for indicating wear
F16D66/02B	. . . . .	[N: using electrical detection or indication means]
F16D66/02B2	. . . . .	[N: indicating that a lining is worn to minimum allowable thickness] [N9411]
F16D66/02B2B	. . . . .	[N: directly sensing the position of braking members] [N9411]
F16D66/02B2B2	. . . . .	[N: Sensors mounted on braking members adapted to contact the brake disc or drum, e.g. wire loops severed on contact] [N9411]
F16D66/02B2D	. . . . .	[N: sensing the position of parts of the brake system other than the braking members, e.g. limit switches mounted on master cylinders] [N9411]

- F16D66/02B4 . . . [N: indicating different degrees of lining wear] [N9411] [C0011]
- F16D66/02B4B [N: Sensors therefor] [N9411]
- F16D66/02B6 . . . [N: with non-electrical sensors or signal transmission, e.g. magnetic, optical] [N9411]

- F16D67/00** **Combinations of couplings and brakes; Combinations of clutches and brakes**
(combinations of couplings and clutches [F16D47/02](#); conjoint control of brake systems and driveline clutches in vehicles [B60W10/02](#), [B60W10/18](#)) [C1203]

- F16D67/02 . Clutch-brake combinations
- F16D67/04 . . fluid actuated
- F16D67/06 . . electromagnetically actuated

- F16D69/00** **Friction linings; Attachment thereof; Selection of coating friction substances or surfaces** (clutching elements [F16D13/60](#); braking members [F16D65/02](#))

- F16D69/02 . Compositions of linings; [N: Methods of manufacturing] [C1202]

[N: **Notes** [N1202]
Indexing codes [R16D69/02A](#) to [R16D69/02H](#) are used for indexing aspects relating to compositions or manufacturing of friction linings
]
- F16D69/02A . . [N: containing asbestos]
- F16D69/02A2 . . . [N: in the form of fibres]
- F16D69/02C . . [N: Composite materials containing carbon and carbon fibres or fibres made of carbonizable material]
- F16D69/02D . . [N: Compositions based on an organic binder]
- F16D69/02D2 . . . [N: containing fibres]
- F16D69/02E . . [N: Compositions based on metals or inorganic oxides]
- F16D69/02E2 . . . [N: containing fibres]

- F16D69/04 . Attachment of linings
- F16D69/04B . . [N: specially adapted for plane linings]
- F16D69/04C . . [N: specially adapted for curved linings]

- F16D71/00** **Mechanisms for bringing members to rest in a predetermined position** (combined with or controlling clutches [F16D43/26](#); means for initiating operation of brakes at a predetermined position [F16D65/14](#); means for securing members after operation [F16B1/02](#))

- F16D71/02 . comprising auxiliary means for producing the final movement

- F16D71/04 . providing for selection between a plurality of positions ([F16D71/02](#) takes precedence)