

3.21	<b>VORTEX-FLOW DRIVE AND CLUTCH</b>	219.1	...Hill-holder
3.22	.With means to effect torque reversal	219.2	....One-way brake
3.23	.With brake	219.3	.....Ball or roller
3.24	..Alternatively operative clutch and brake	219.4	...Emergency or parking brake
3.25	.With additional drive or clutch	219.5	....Parking pawl
3.26	..Simultaneously operative clutches	219.6	....With separate manual operator
3.27	..Alternatively operative clutches	219.7	.....Foot operated
3.28	.Including drive-lockup clutch	220	..Brake control affects transmission change
3.29	..Having fluid-pressure operator	220.1	...Brake application neutralizes transmission
3.3	...With auxiliary source of pressure	220.2	...Park-lock device
3.31	..Having speed-responsive operator	220.3	....Floor-mounted shift lever
3.32	..Alternatively operative drive and clutch	220.4	.....Solenoid operated lock
3.33	..Fluid-pressure operator for engaging clutch	220.5	.....Rotary bushing
3.34	<b>VORTEX-FLOW DRIVE AND BRAKE</b>	220.6	.....Override
3.51	<b>TRANSMISSION CONTROL AND CLUTCH CONTROL</b>	220.7	.....Override
3.52	..Planetary transmission and coaxial clutch	221	..Fluid operated
3.53	..Including separate, reversing pedal	221.1	...Brake and gearing at axle end
3.54	..Common control	222	..Electromagnetic
3.55	..Power-operated clutch	223	.Torque-responsive brake
3.56	...Electromagnetically operated	223.1	..Transversely engaged positive brake
3.57	...Fluid-press operated	223.2	..Ball or roller type brake
3.58	....Electrically triggered	223.3	..With cam mechanism for axially moving brake member
3.59	....Vacuum operated	223.4	..Wrap-spring brake
3.61	..Stepped ratio transmission	224	.Belt or chain transmission
3.62	..With control lever	224.1	..Belt tensioner affects brake operation
3.63	..Interrelated (e.g., with interlock)	224.2	..Belt failure operates brake
215	<b>TRANSMISSION AND BRAKE</b>	224.3	..Belt shipper affects brake operation
216	..Internal resistance brake	225	.Fluid operated
217	..Velocipede	226	.Electromagnetic
217.1	..Back-pedaling brake (e.g., coaster brake)	12 R	<b>CLUTCH AND BRAKE</b>
217.2	...Rotatable crank axle	13 R	.Vehicle type
217.3	...Wheel hub	13 A	..Clutch-released brake holder
217.4	....With change-speed transmission	14	.Same member
217.5	.....Plural sprockets	15	.Automatic check and release
217.6	....With screw operator	16	..Clutch and brake same member
217.7	....Multidisc brake	17 R	.Peripheral brake
218	..Motor vehicle	17 A	..Fluid operator
219	..Transmission control affects brake	17 C	..Electric
		17 D	..Coil
		18 R	.Sliding operation
		18 A	..Fluid operator
		18 B	..Electric and magnetic
		19	.Crank control
		12 A	.Internal resistance
		12 B	.One-way engaging
		12 BA	..Coil spring type
		12 C	.Fluid operator

12 D	.Electric	48.602	...Operator rotatable relative to its clutch-assembly
20	<b>CLUTCH AND GEAR</b>		
21	.Reversing	48.603	...Operator coaxial with its clutch-assembly
21.5	<b>FIELD RESPONSIVE FRICTIONAL MEDIA TYPE</b>	48.604	....Common or interconnected operator(s)
22	<b>LATCH OPERATED</b>		
23	.Corn-planter type	48.605	.....Operator between clutch-assemblies
24	.Longitudinally moving transmission member	48.606	....Axially spaced coaxial clutch-assemblies
25	..Pin		
26	.Transversely moving transmission member	48.607	...Axially spaced coaxial clutch-assemblies
27	..Ball or roller	48.608	...Plural fluid pressure operators forming nested pistons
28	..Positive		
29	...Rotating key		
30 R	<b>CLUTCHES</b>	48.609	...Axially spaced coaxial clutch-assemblies
31	.Automatic		
32	..Manual control	48.61	...Plural fluid pressure operators forming nested pistons
33 R	...Definite-position release		
33 C	....Coil		
34	...Shaft thrust	48.611	...Operator coaxial with its clutch-assembly
35	...Pilot mechanism	48.612	....Common or interconnected operator(s)
36	...Brake band	48.613	.....Operator between clutch-assemblies
37	...Transversely moving	48.614	....Operator between clutch-assemblies
38	....Ball or roller		
39	....Positive		
40	...Electric	48.615	...Radially acting operator
41 R	..One-way engaging	48.616	...Plural fluid pressure operators forming nested pistons
42	...Free-engine type		
43	...Reversible		
43.1	....Pivoted pawls		
43.2	....Slidable pawls	48.617	...At least one operator coaxial with its clutch-assembly
44	....Ball or roller		
45	...Ball or roller	48.618	...Operator coaxial with its clutch-assembly
45.1	...Wedging pawl or block	48.619	...Radially spaced coaxial clutch-assemblies
45.2	...Two-point gripper		
46	...Positive	48.7	..With means to actuate or deactuate clutch-assemblies sequentially
47	..Manual control		
41 S	...Spring	48.8	..Associated with three or more shafts
41 A	...Sprags	48.9	...Alternatively operative assemblies
48.1	.Plural clutch-assembly	48.91	....Having common clutch-element support
48.2	..Including electrically actuated clutch assembly	48.92	..Including unirotationally engaging clutch-elements
48.3	..Diverse clutch-assemblies	49	..Parallel vehicle wheels
48.4	...Including three or more assemblies	50	...Free wheel
48.5	...Including one clutch-assembly having interdigitated clutch-elements	51	..Reversing
48.6	....And another clutch-assembly having unirotationally engaging clutch elements	52.1	.Progressive engagement
48.601	..Having fluid pressure operator	52.2	..Surface area

52.3	...Yielding	55.61	.....Coil springs with center line spaced from rotational axis
52.4	..Variable force		
52.5	...Initial engagement causes increase in applied force	55.62	.....Center line of coil springs parallel to rotational axis
52.6	..Yielding	55.7	...Coil spring with center line spaced from rotational axis
53.1	..Frictional and positive	56.1	..Overload release
53.2	...Magnetic or electromagnetic operated friction clutch	56.2	...Coil
53.3	...With blocker	56.3	...Fluid-operated clutch
53.31	....Self-energizing	56.31	....Axially engaged
53.32	....Interposed friction members	56.32	.....Positive
53.33	....Member extending axially between friction surfaces	56.33	.....Ball or roller
53.331	.....Blocker on axially extending stepped pin	56.4	...Magnetic or electromagnetic
53.332	.....Resilient detent pin	56.41	....Axially engaged
53.34	....Outward tooth or lug on friction member	56.42	.....Positive
53.341	.....With thrust member	56.43	.....Ball or roller
53.342	.....Resilient thrust bar	56.5	..Clutch elements remain disengaged after overload corrected
53.343	.....Resilient expander ring	56.51	...Having separate latch to hold clutch elements disengaged
53.35	....Inward tooth or lug on friction member	56.52	....Axially engaged
53.36	....Radially movable blocker	56.53	.....Positive
53.361	.....Detent acts as blocker	56.54	.....Ball or roller
53.362	.....Rocker lever actuates friction clutch	56.55	....Axially engaged
53.363	.....Radially movable friction element acts as blocker	56.56	.....Positive
53.364	.....Resilient friction element	56.57	.....Ball or roller
53.4	...Lock for positive clutch	56.6	...Axially engaged
53.5	...Axially projecting positive clutch	56.61	....Positive
53.51	....Cylindrical pin	56.62	....Ball or roller
53.6	...Transversely moving positive clutch	54.3	..Fluid operated
54.1	..Torque responsive	54.4	..Magnetic or electromagnetic
54.2	..Hub clutch	57	.Fluent material and mechanical
54.5	..Cam operated	58.1	.Fluent material
54.51	...Screw operated	58.2	..Fluid
54.52	...Ball or roller type	58.3	...Vane clutch
55.1	..With overload release coupling	58.4	...Viscous shear
55.2	..With flexible shaft coupling permitting limited relative rotation	58.41	....Multiple plate
55.3	...Separate resilient member between clutch element and its shaft	58.42	....Variable gap or volume
55.4	....Fluid damper	58.43	....Variable gap or volume
55.5	....Coil spring coaxial with rotation axis	58.5	....Separate reservoir
55.51	.....Radially overlapping convolutions	58.6	....Automatic regulation
55.6	....Plural resilient members	58.61	.....Magnetic or electric
		58.62	.....Temperature and speed
		58.63	.....Temperature
		58.64	.....Coolant and clutching medium
		58.65	.....Ambient and clutching medium
		58.66	.....Ambient and coolant
		58.67	.....Clutching medium
		58.68	.....Ambient
		58.681	.....Bi-metallic

58.682	.....Spiral	70.12	...With means to cool or lubricate clutch parts
58.683	.....Resilient or adjustable mounting feature	70.13	...With removable or replaceable or interchangeable clutch parts
58.684	.....Mounting feature	70.14	...Including surface characteristics of clutch-element
58.7	.....Pump-out feature	70.15	...Axially tapered mating surfaces
58.8	.....Specific valve	70.16	...With torque connection between clutch-element and its shaft
58.9	...Radial vane	70.17	...Resilient torque connection (e.g., for damping vibration)
58.91	...Vaness on inner member	70.18	....Including chordally disposed connection
58.92	.....Spring-biased	70.19	....Axially slidable connection
59	..Axially movable piston	70.2	....Spline connection for multiple clutch-elements
60	..Transversely movable piston	70.21	...With means to move multiple clutch-elements axially and sequentially
61	..Gear-pump type	70.22	...With means to move clutch-element axially and latch into engaged or disengaged position
62	..Plow-lifting type	70.23	...With cam or wedge contacting clutch-element or pressure plate for axial movement thereof
63	..Free-engine type	70.24	...By cam surface on bell-crank
64	..Velocipede free wheel	70.251	...With adjustable means to move clutch-element axially (e.g., to compensate for wear)
65	..Axially and transversely engaging	70.252	....Automatic
66.1	..Axially engaging	70.26	....Including plural adjusting screws (e.g., to equalize pressure angularly)
66.2	..Conical or frustoconical	70.27	...With spring means to move clutch-element axially
66.21	...Plural radially spaced surfaces	70.28	...To separate engaged clutch-elements
66.22	...Spring engaged	70.29	...And actuator lever pivoted on pressure plate
66.23	...Spring released	70.3	...With actuator lever pivoted on pressure plate or back plate to move clutch-element axially
66.3	..Planar radially extending		.Transversely engaged
66.31	...Spring engaged	71	..Positive
66.32	...Spring released	72	..Interior and exterior
69	..Positive	73	...Opposing
69.1	...Pivoting positive clutch element	74	..Interior
69.2	...Plunger disconnect	75	...Expanding
69.3	...Pilot pawl	76	....Radial
69.4	...Wheel hub clutched to axle	77	....Split ring
69.41	....Fluid pressure	78	....Cam operated
69.42	....Electromagnetic		
69.43	....Manual		
69.5	...Ball or roller		
69.6	...Cylindrical pin		
69.61	....Axial pin on only one member		
69.62	....Pin engages aperture in other member		
69.63	....Radial pin		
69.7	...Axial-radial		
69.71	....Axially extending projection engages aperture		
69.8	...Axial-axial		
69.81	....Sawtooth		
69.82	....Square tooth		
69.83	....With lead-in		
69.9	...Radial-radial		
69.91	....Outward projection on movable member		
70	..Spreading		
70.11	..Interposed, mating clutch-elements		

79	..Exterior	85.11	.....Clutch has positively engaging clutch members
80	...Strap	85.12	.....And causing purely radial movement
81 R	....Multiple folds	85.13	.....Elastic operator integral with radially outer clutch member
81 C	.....Coil	85.14	...Rotatable relative to clutch input and output
82 R	.Operators	85.15	....And causing purely axial movement
83	..Multiple for same clutch	85.16	....And causing purely radial movement
84.1	..Electric or magnetic	85.17	...Piston and cylinder operator rotating with clutch input or output
84.2	...Plural coils	85.18	....Positive clutch
84.21	....Plural armatures	85.19	....Friction clutch
84.3	...Including permanent magnet	85.2	....Having friction elements movable axially only
84.31	....And electromagnet	85.21	.....Having conical or frustoconical friction surfaces (e.g., cone clutch)
84.4	...Electrostatic	85.22	.....Plural radially spaced frustoconical surfaces
84.5	...Air gap adjustment	85.23	.....Having flat friction surfaces
84.51	....Automatic	85.24	.....More than two friction elements
84.6	...Rotary electric motor is clutch actuator	85.25	.....Including balance chamber
84.7	...Mechanical force increasing means	85.26	.....Cam mechanism between piston and friction element
84.8	...Operator for transversely engaging elements	85.27	.....Auxiliary exhaust or relief passage from piston chamber
84.81	....Coil spring	85.28	.....Fluid escape from piston chamber by rotation-induced pressure
84.9	...Operator for axially engaging elements	85.29	.....In piston
84.91	....Interposed friction elements	85.3	.....Valve in passage
84.92	....Positively engaging elements	85.31	.....Valve in passage
84.93	....Magnetic flux path spaced from engaging elements	85.32	.....Variable fluid contacting piston area
84.94	....Specified torque transmitting spring	85.33	.....Axially stationary piston, moving cylinder
84.941	.....Nonmetallic	85.34	.....Cushioning element between piston and friction element
84.95	....With slip rings	85.35	.....Operator acts on friction elements via diaphragm spring or lever
84.951	.....With pulley or gear	85.36	.....Electric or magnetic release
84.96	....Fixed concentric coil	85.37	.....Fluid released clutch
84.961	.....With pulley or gear		
85.01	..Fluid pressure		
85.02	...Operator force derived from clutch input or output		
85.03	...Elastic (e.g., diaphragm, pneumatic tube)		
85.04	....Rotating with clutch input or output		
85.05	.....And causing purely axial movement		
85.06	.....Including flexible friction discs		
85.07	.....Plural oppositely acting elastic operators		
85.08	.....Clutch has flat friction surfaces		
85.09	.....More than two friction elements		
85.1	.....Plate or diaphragm spring release		

85.38	.....And fluid pressure engaged	89.28	....Transversely engaged
85.39	.....Spring released clutch	89.29	...Quick throw spring
85.4	.....Release spring between discs	92	..One-direction apply and release
85.41	.....Coil spring	93 R	..Cam
85.42	.....Encircling clutch axis of rotation	93 A	...Axially thrusting cams rotatable about clutch axis
85.43	.....Having particular friction element structure	93 B	...Axially moving cam acting on pivoted lever
85.44	.....Having particular piston seal	93 C	...Axially moving cam acting on transversely moving wedge or clutch member
85.45	.....Piston has interrupted engagement face	94	..Screw
85.46	.....Piston has non-planar engagement face	95	..Handwheel
85.47	....Having radially displaceable friction surface	96	..Central pin
85.48	...Operator rotatable relative to clutch input and output	97	...Screw operated
85.49	....And aligned with clutch axis of rotation	98	..Shipper saddles
85.5	....Operator acts on clutch through push rod extending coaxially through input or output shaft	99 R	..Lever systems
85.51	....Operator acts on clutch via diaphragm spring or lever	99 A	...Levers mounted on axially engaging clutch
85.52	.....Pull-to-release type clutch	99 B	...Levers mounted on transversely engaging clutch
85.53	.....Details of fluid operator	99 S	...Stationary levers
85.54	.....Having particular seal	100	..Follow-up
85.55	.....Details of master cylinder	101	..Releasing
85.56	....Operator spaced from and parallel to clutch axis of rotation	102	..Check of driven member
85.57	....Fluid released clutch	103 R	..Speed responsive
85.58	....By vacuum	104 R	...Fixed-speed release
85.59	....Details of fluid operator	104 B	....Transversely engaged-interior
85.6	....Details of master cylinder	104 C	....Transversely engaged-exterior
85.61	...Cooling or lubricating	104 F	....Fluid clutches and operators
85.62	...Having wear compensator	105 R	...Fixed-speed engagement
85.63	...Including fluid pressure control	105 A	....Centrifugal (fluid or powder) nonpivoted weights (radially movably or slidable) i.e., mercury clutch
89.1	..Weight operated	105 B	....Axially engaged with nonpivoted weights-weights movable radially or slidable
89.2	..Spring engaged	105 BA	....Transversely engaged with nonpivoted weights
90	...Electric release	105 BB	....Transversely engaged positive with nonpivoted weights
89.21	...Cam release	105 C	....Axially engaged with pivoted weights
89.22	...Belleville disc spring	105 CP	....Weights pivoted on axis parallel to clutch axis-axially engaged
89.23	....Push-type	105 CS	....Single pair clutching elements axially engaged with pivoted weights
89.24	....Pull-type	105 CD	....Transversely expanding clutch with pivoted weights
89.25	....Geometric configuration	105 CE	....Transversely engaged-pivoted weights and clutching elements movable separately
89.26	...Plural coil springs spaced from clutch axis		
89.27	...Coil spring coaxial to clutch axis		

105 CF	....Transversely contracting	107 R	.Engaging surfaces
105 F	....Fluid controls for centrifugal clutches	108	..Positive
106 R	...Release	107 M	..Material
106 F	....Devices to prevent fluid clutches from being operated by centrifugal forces acting on fluid	107 T	..Transversely engaging
103 A	...Centrifugal operated, axially engaged	107 C	..Clutch plate axially compressible
103 B	...Centrifugal operator transversely engaged	109 R	.Thrust members, retarders, and stops
103 C	...Acceleration and inertia responsive	109 A	..Resilient operators and pressure plates
103 F	...Fluid operated	109 B	..Resilient backing plates
103 FA	...Fluid pressure engaged with centrifugal valve	109 F	..Cushioning devices for fluid operators
82 P	..Rack and pinion operator	109 D	..Dashpot
82 T	..Temperature operator	110 R	.Shafts, bearings, and adjusting devices
30 W	.Warning, indicating, and signal devices	110 B	..Bearings
30 V	.Vibration dampers	110 S	..Shafts for removable clutches or discs
	<b>ELEMENTS</b>	111.1	.Wear compensators
200	.Clutch element resiliently carried on hub	111.11	..Compensator in actuating mechanism outside of the clutch (EPO)
201	..Speed-responsive	111.12	...Automatic
202	..Manually adjustable	111.13	..Compensator in or near release bearing (EPO)
203	..Coil spring detail	111.14	...Automatic
204	..Specified bushing	111.15	..Compensator on or inside clutch cover (e.g., acting on diaphragm or pressure plate) (EPO)
205	..Separate seat detail	111.16	...Automatic
206	..Relatively axially movable hub sections	111.17	...Worm mechanism
207	..Circumferential resilience	111.18	...Relatively rotatable cam rings
208	...With fluid damping	111.19	....Between cover and diaphragm spring
209	...Nonmetallic	111.2	....Between diaphragm spring and pressure plate
210	....Interposed friction element	111.3	.....Having clearance sensor bridging gap between clutch members and moveable only during engagement
210.1	.....Biasing means	111.4	....Having clearance sensor bridging gap between clutch members and moveable only during engagement
211	....And coil spring	111.5	...Relatively rotatable cam rings
212	...Coil spring	111.6	..Threaded element centered on clutch axis
213	....Plural helical coil spring damping stages	111.7	....Threaded in clutch cover
213.1	.....Plural axially spaced springs	112	.Casings
213.11	.....Interposed friction element	113.1	.Lubricating, insulating, or cooling
213.12	.....Biasing means	113.2	..Air cooling
213.2	....Plural radially spaced springs in a common radial plane		
213.21	.....Interposed friction element		
213.22	.....Biasing means		
213.3	....Interposed friction element		
213.31	.....Biasing means		
214	....Interposed friction element		
214.1	.....Biasing means		

113.21 ...Heat radiating structure  
 113.22 ...Grooved surfaces  
 113.23 ...Air directing structure  
 113.24 ....Rotating cover  
 113.25 ....Spring  
 113.26 ....Clutch plate  
 113.3 ..Liquid cooled or lubricated  
         clutch surfaces  
 113.31 ...Entire coolant path is spaced  
         from clutch surfaces  
 113.32 ...Overrunning clutch  
 113.33 ...Positive  
 113.34 ...Lubricant or coolant between  
         engaging surfaces  
 113.35 ....With change of coolant flow  
         during disengagement  
 113.36 ....Grooved surfaces  
 113.4 ..Thermal insulating  
 113.5 ..Lubrication of ancillary clutch  
         parts  
 114 R ..Locks  
 114 T ..Interlocking clutch teeth or  
         splines  
 115 ..Supports  
 116.5 **STOP MECHANISM**  
 125 R ..Material control  
 126 ..Sheet material  
 127 ...Electrical  
 128 ...Pneumatic  
 125 A ..Power stop-material control-  
         electrical  
 125 B ..Mechanical  
 125 C ..Pneumatic  
 125 D ..Granular material  
 125 E ..Work start  
 125 F ..Length of material stop  
 129 R ..Safety device  
 130 ..Hand protector  
 131 R ...Two hand  
 131 H ....Hand and foot  
 132 ...Delayed action drive  
 133 ..Automatic guard  
 134 ...Punch-press type  
 135 ...Cover  
 136 ....Centrifugal-machine type  
 137 ...Disabled transmission  
 129 A ..Electrical  
 129 B ..Pneumatic  
 138 ..Limit stop  
 139 ..Rotary-member control  
 140 ...Speed responsive  
 141 ...Screw  
 142 R ...Electrical  
 142 A ....Radio tuner type

143 ..Reciprocating-member control  
 144 ..Drive release and brake  
 145 ..Multiple clutch  
 146 ..Change speed  
 147 ..Speed responsive  
 148 ..Positive stop  
 149 ...Cushioned  
 150 ..Overload release

#### **FOREIGN ART COLLECTIONS**

##### FOR 000 **CLASS-RELATED FOREIGN DOCUMENTS**

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collections listed below. These Collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

#### **CLUTCHES (192/30)**

.Operators (192/82 R)  
 FOR 100 ..Electric (192/84 R)  
 FOR 101 **TRANSMISSION CONTROL AND BRAKE  
 (192/4 R)**  
 FOR 102 ..Back-pedaling brake (192/5)  
 FOR 103 ..Hub brake (192/6 R)  
 FOR 104 ...With change speed transmission  
         (192/6 A)  
 FOR 105 ...Rotatable axle (192/6 B)  
 FOR 106 ..Automatic brake (192/7)  
 FOR 107 ..Responsive to drive release  
         (192/8/R)  
 FOR 108 ...Cable (192/8 A)  
 FOR 109 ...Coil brake (192/8 C)  
 FOR 110 ..Electric control (192/9)  
 FOR 111 ..Belt shipper (192/10)  
 FOR 112 ..Belt tightener (192/11)  
 FOR 113 ..Automatic type (192/4 A)  
 FOR 114 ..Internal resistance brake (192/4  
         B)  
 FOR 115 ..Forward and reverse gearing  
         (192/4 C)

#### **CLUTCHES**

.Axially engaging  
 ..Interposed, mating clutch-  
         elements

FOR 116 ...With adjustable means to move  
clutch-element axially (e.g.,  
to compensate for wear) (192/  
70.25)

**ELEMENTS**

FOR 117 .Wear compensators (192/111)

**DIGESTS**

DIG 1    **REMOVABLE MEMBERS**

DIG 2    **UNIVERSAL JOINT**

