CPC COOPERATIVE PATENT CLASSIFICATION

E02F DREDGING; SOIL-SHIFTING (winning peat E21C 49/00)

NOTE

This subclass covers :

- primarily equipment for excavating or loosening earth or for moving loose earth;
- equipment for working similarly on other materials and similar equipment for loading or unloading materials

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

E02F 3/32 covered by E02F 3/30, E02F 3/425
E02F 3/39 covered by E02F 3/286, E02F 3/30K, E02F 3/34K
E02F 3/78 " " E02F 7/76 + s.gr.
E02F 3/85 " " E02F 3/84A, E02F 3/842, E02F 3/84B, E02F 3/845, E02F 3/847
E02F 5/04 " " E21B
E02F 5/06 " " E02F 3/08
E02F 5/08 " " E02F 3/18
E02F 5/16 " " E21B
E02F 5/18 " " E21B
E02F 5/20 " " E21B

Guidance heading:

E02F 1/00 **General working methods with dredgers or soil-shifting machines** (methods for making embankments E02D 17/18; methods for mining E21C)

E02F 3/00 **Dredgers; Soil-shifting machines** (for special purposes E02F 5/00; other machines or apparatus for mining E21C ; tunnelling E21D)

E02F 3/02 . hand-operated; { handheld soil shifting equipment acting by sucking E02F 3/8891 (spades or rakes for agriculture or gardening purposes A01B) }

E02F 3/04 . mechanically-driven

E02F 3/045 . . {with oscillating digging tools, e.g. oscillating spades }

E02F 3/06 . . with digging screws { (earth drilling E21 ; for digging trenches or ditches E02F 5/04) }

E02F 3/08 . . with digging elements on an endless chain, { e.g. bucket-type chains (for digging trenches or ditches E02F 5/06; cutting machines for mining or quarrying E21C 25/22) }

E02F 3/081 . . . {mounted on floating substructures (floating substructures per se E02F 9/06) }

E02F 3/082 . . . { including a belt-type conveyer for transporting the excavated material }

E02F 3/083 . . . { including a screw-type conveyer for transporting the excavated material }

E02F 3/085 . . . { with auxiliary or additional digging elements other than digging elements on an endless chain }

E02F 3/086 . . . { vertically shiftable relative to the frame }

E02F 3/087 . . . { with digging unit working in a plane inclined to the direction of travel }

E02F 3/088 . . . { pivotable relative to the frame }

E02F 3/10 . . . with tools that only loosen the material, {i.e. with cutter-type chains }

E02F 3/12 . . . Component parts {e.g. bucket troughs }

E02F 3/14 . . . . Buckets; Chains; Guides for buckets or chains; Drives for chains {not used, see subgroups }

E02F 3/141 . . . . . {buckets }

E02F 3/142 . . . . . {tools mounted on buckets or chains which loosen the soil, e.g. cutting wheels, or the like (teeth per se E02F 9/28) }

E02F 3/143 . . . . . { chains; chain links; scraper chains (chains or chain guides E21C 25/28) }

E02F 3/144 . . . . . {emptying or cleaning the buckets, e.g. in combination with spoil removing equipment }

E02F 3/145 . . . . . {drives }

E02F 3/146 . . . . . { guides for chains or buckets, e.g. for buckets movable relative to chains (chains or chain guides E21C 25/28) }

E02F 3/147 . . . . . {arrangements for the co-operation between buckets or buckets and wheels }

E02F 3/148 . . . . . {wheels, sprokets }

E02F 3/16 . . . . Safety or control devices (safety devices in general F16P ; controlling in general G05)

E02F 3/18 . . with digging wheels turning round an axis, { e.g. bucket-type wheels (for digging trenches E02F 5/08; for laying cables underwater E02F 5/109; cutting machines E21C25; methods or apparatus for making tunnels or galleries E21D9) }

E02F 3/181 . . . { including a conveyer }

E02F 3/183 . . . { with digging unit shiftable relative to the frame }

E02F 3/185 . . . { with digging unit mounted in a plane which is inclined to the direction of travel; with tools digging laterally with respect to the frame }

E02F 3/186 . . . { with the axis being substantially parallel to the direction of travel }

E02F 3/188 . . . { with the axis being horizontal and transverse to the direction of travel }

E02F 3/20 . . . with tools that only loosen the material, {i.e. mill-type wheels }

E02F 3/205 . . . . { with a pair of digging wheels, e.g. slotting machines (implements for making foundation slots with definition of the walls or foundations E02D 17/13; bulkheads or similar walls made solely of concrete in situ E02D 5/18; with a pair of buckets E02F 3/475) }

E02F 3/22 . . . Component parts

E02F 3/24 . . . . Digging wheels; Digging elements of wheels; Drives for wheels

E02F 3/241 . . . . . {digging wheels }

E02F 3/243 . . . . . {wheels rotatable in both directions }

E02F 3/245 . . . . . {with digging elements mounted movable relative to the wheel }

E02F 3/246 . . . . . {drives }

E02F 3/248 . . . . . { Cleaning the wheels or emptying the digging elements mounted on the wheels, e.g. in combination with spoil removing equipment }

E02F 3/26 . . . . Safety or control devices (safety devices in general F16P ; controlling in general G05B)

E02F 3/28 . . with digging tools mounted on a dipper- or bucket-arm, {i.e. there is either one arm or a pair of arms }, e.g. dippers, buckets

E02F 3/283 . . . { with a single arm pivoted directly on the chassis (linkage mechanism for it E02F 3/3405) }

E02F 3/286 . . . . { telescopic or slidable (fork-lift trucks with a telescopic boom B66F 9/0655) }

E02F 3/30 . . . with a dipper-arm pivoted on a cantilever beam, {i.e. boom }

E02F 3/301 . . . . { with more than two arms (boom included) , e.g. two-part boom with additional dipper-arm }

E02F 3/302 . . . . {with an additional link }

E02F 3/303 . . . . { with the dipper-arm or boom rotatable about its longitudinal axis }

E02F 3/304 . . . . { with the dipper-arm slidably mounted on the boom (E02F 3/305 takes precedence) }

E02F 3/305 . . . . {with the dipper-arm slidably mounted on the boom and the boom slidably mounted on the frame }

E02F 3/306 . . . . { with telescopic dipper-arm or boom }

E02F 3/307 . . . . {the boom and the dipper-arm being connected so as to permit relative movement in more than one plane }

E02F 3/308 . . . . { working outwardly }

E02F 3/32 . . . . working downwardly and towards the machine, e.g. with backhoes

E02F 3/325 . . . . . { Backhoes of the miniature type }

E02F 3/34 . . . with bucket-arms { i.e. a pair of arms, e.g. manufacturing processes, form, geometry, material of bucket-arms (with a single arm E02F 3/283) } directly pivoted on the frames of tractors or self-propelled machines

E02F 3/3402 . . . . { the arms being telescopic (fork-lift trucks with a telescopic boom B66F 9/0655) }

E02F 3/3405 . . . . {and comprising an additional linkage mechanism }

E02F 3/3408 . . . . . {of the parallelogram-type }

E02F 3/3411 . . . . . {of the Z-type }

E02F 3/3414 . . . . { the arms being pivoted at the rear of the vehicle chassis, e.g. skid steer loader }

E02F 3/3417 . . . . {Buckets emptying by tilting (E02F 3/342, E02F 3/345 take precedence) }

E02F 3/342 . . . . Buckets emptying overhead (E02F 3/348 to E02F 3/358 take precedence)

E02F 3/345 . . . . Buckets emptying side-ways (E02F 3/348 to E02F 3/358 take precedence)

E02F 3/348 . . . . Buckets emptying into a collecting or conveying device

E02F 3/3483 . . . . . {Buckets discharging on a conveyer or elevator mounted on the machine }

E02F 3/3486 . . . . . {Buckets discharging overhead into a container mounted on the machine }

E02F 3/352 . . . . Buckets movable along a fixed guide

E02F 3/355 . . . . Buckets connected to the rear end of a tractor {not used }

E02F 3/358 . . . . Bucket-arms pivoted on a turntable being part of a tractor frame {or buckets arranged on a turntable supported by the arms }

E02F 3/36 . . . Component parts

E02F 3/3604 . . . . { Devices to connect tools to arms, booms or the like }

E02F 3/3609 ..... { of the quick acting type, e.g. controlled from the operator seat (quick-acting couplers to connect booms or arms to tractors E02F 3/627; quick-acting couplers for machines mounted on tractor A01B 59/06; couplings of the quick-acting type per se F16L37) }

E02F 3/3613 ..... { with means for absorbing any play therebetween (E02F 3/364 takes precedence) }

E02F 3/3618 ..... { with two separating hooks }

E02F 3/3622 ..... { with a hook and a locking element acting on a pin }

E02F 3/3627 ..... { with a hook and a longitudinal locking element }

E02F 3/3631 ..... { with a hook and a transversal locking element }

E02F 3/3636 ..... { using two or four movable transversal pins }

E02F 3/364 ..... { using wedges }

E02F 3/3645 ..... { with auto-engagement means for automatic snap-on of the tool coupler part }

E02F 3/365 ..... { with redundant latching means, e.g. for safety purposes }

E02F 3/3654 ..... { with energy coupler, e.g. coupler for hydraulic or electric lines, to provide energy to drive(s) mounted on the tool }

E02F 3/3659 ..... { electrically-operated }

E02F 3/3663 ..... { hydraulically-operated }

E02F 3/3668 ..... { where engagement is effected by a mechanical lever or handle }

E02F 3/3672 ..... { where disengagement is effected by a mechanical lever or handle }

E02F 3/3677 ..... { allowing movement, e.g. rotation or translation, of the tool around or along another axis as the movement implied by the boom or arms, e.g. for tilting buckets }

E02F 3/3681 ..... { Rotators }

E02F 3/3686 ..... { using adapters, i.e. additional element to mount between the coupler and the tool }

E02F 3/369 .... { Devices to connect parts of a boom or an arm (devices to connect booms or arms to tractors E02F 3/627) }

E02F 3/3695 .... { Arrangements for connecting dipper-arms to loaders or graders }

E02F 3/38 .... Cantilever beams { i.e. booms; e.g. manufacturing processes, forms, geometry or materials used for booms (for booms with cable suspension arrangements E02F 9/14 takes precedence) }; Dipper-arms { e.g. manufacturing processes, forms, geometry or materials used for dipper-arms }; Bucket-arms { (E02F 3/34 takes precedence) }

E02F 3/382 ..... { Connections to the frame; Supports for booms or arms (devices to connect booms or arms to tractors or similar machines E02F 3/627; pivot joint assemblies in particular E02F 9/006) }

E02F 3/384 ..... {the boom being pivotable relative to the frame about a vertical axis }

E02F 3/386 ..... {the boom being laterally shiftable relative to the frame }

E02F 3/388 ..... { Mechanical locking means for booms or arms against rotation, e.g. during transport of the machine (transporting-cranes B66C 23/344) }

E02F 3/40 .... Dippers; Buckets { Grab device, e.g. manufacturing processes for buckets, form, geometry, material of buckets (devices to connect tools to arms or booms E02F 3/3604; teeth therefor E02F 9/28) }

E02F 3/401 ..... {Buckets or forks comprising, for example, shock absorbers, supports or load striking scrapers to prevent overload }

E02F 3/402 ..... {with means for facilitating the loading thereof, e.g. conveyers }

E02F 3/404 . . . . . {comprising two parts movable relative to each other, e.g. for gripping }

E02F 3/405 . . . . . {using vibrating means (blades or levelling tools with vibrating teeth E02F 3/8155; vibrating rippers E02F 5/326) }

E02F 3/407 . . . . . with ejecting {or other unloading } device

E02F 3/4075 . . . . . {Dump doors; Control thereof }

E02F 3/413 . . . . . with grabbing device ({ E02F 3/404 takes precedence; with grab buckets moved by cables or hoisting ropes E02F 3/47; } grab equipment for cranes B66C)

E02F 3/4131 . . . . . {mounted on a floating substructure (floating substructures per se E02F 9/06) }

E02F 3/4133 . . . . . {grabs carried out as loaders or mounted on a tractor }

E02F 3/4135 . . . . . {with grabs mounted directly on a boom }

E02F 3/4136 . . . . . { with grabs mounted on a slidable or telescopic boom or arm }

E02F 3/4138 . . . . . {the grab being emptied by flushing }

E02F 3/42 . . . . Drives for dippers, buckets, dipper-arms or bucket-arms

E02F 3/422 . . . . . {Drive systems for bucket-arms, front-end loaders, dumpers or the like }

E02F 3/425 . . . . . {Drive systems for dipper-arms, backhoes or the like }

E02F 3/427 . . . . . { with mechanical drives (by cables or hoisting ropes E02F 3/46 take precedence) }

E02F 3/43 . . . . . Control of dipper or bucket position; Control of sequence of drive operations

E02F 3/431 . . . . . {for bucket-arms, front-end loaders, dumpers or the like }

E02F 3/432 . . . . . {for keeping the bucket in a predetermined position or attitude }

E02F 3/433 . . . . . {horizontal, e.g. self-levelling }

E02F 3/434 . . . . . {providing automatic sequences of movements, e.g. automatic dumping or loading, automatic return-to-dig }

E02F 3/435 . . . . . {for dipper-arms, backhoes or the like }

E02F 3/436 . . . . . {for keeping the dipper in the horizontal position, e.g. self-levelling }

E02F 3/437 . . . . . {providing automatic sequences of movements, e.g. linear excavation, keeping dipper angle constant }

E02F 3/438 . . . . . {Memorising movements for repetition, e.g. play-back capability }

E02F 3/439 . . . . . {Automatic repositioning of the implement, e.g. automatic dumping, auto-return (E02F 3/438 takes precedence) }

E02F 3/46 . . with reciprocating digging or scraping elements moved by cables or hoisting ropes; { Drives or control devices therefor (E02F 3/205, E02F 3/905 take precedence) }

E02F 3/47 . . . with grab buckets (grab equipment for cranes B66C)

E02F 3/475 . . . . { for making foundation slots (slotting machines with a pair of digging wheels E02F 3/205) }

E02F 3/48 . . . Drag-lines

E02F 3/50 . . . with buckets or other digging elements moved along a rigid guideway

E02F 3/52 . . . Cableway excavators (cable cranes B66C)

E02F 3/54 . . . Cable scrapers { (E02F 3/48, E02F 3/52 take precedence) }

E02F 3/56 . . . . with hand-controlled scraper or other digging elements

E02F 3/58 . . . Component parts { (E02F 9/14, E02F 3/905 take precedence) }

E02F 3/60 . . . . Buckets, scrapers, or other digging elements

E02F 3/627 . . Devices to connect beams or arms to tractors or similar self-propelled machines, { e.g. drives therefor (Connection of beams or booms or arms to the frame per se E02F 3/382; connection of scraper bowls to the vehicle main body E02F 3/653; connecting devices for agriculture tractors A01B 59/06) }

E02F 3/6273 . . . {using legs to support the beams or arms on the ground during the connecting process }

E02F 3/6276 . . . { on one side of the frame }

E02F 3/633 . . . Drives therefor { (not used, seeE02F 3/627) }

E02F 3/64 . . Buckets cars, i.e. having scraper bowls { (for cable scrapers E02F 3/54 takes precedence; soil working machines in agriculture A01B) }

E02F 3/6409 . . . { Self-propelled scrapers }

E02F 3/6418 . . . . { with rotatable scraper bowls for dumping the soil (with only elements of the scraper bowls being pivotable E02F 3/6427) }

E02F 3/6427 . . . . { with elements of the scraper bowls being pivotable for dumping the soil (E02F 3/6445 take precedence; with an ejector having translational movement E02F 3/6436) }

E02F 3/6436 . . . . { with scraper bowls with an ejector having translational movement for dumping the soil (E02F 3/6445 takes precedence) }

E02F 3/6445 . . . . { with conveying means for emptying the scraper bowl }

E02F 3/6454 . . . { Towed (i.e. pulled or pushed) scrapers }

E02F 3/6463 . . . . { with rotatable scraper bowls for dumping the soil (with only elements of the scraper bowls being pivotable E02F 3/6472) }

E02F 3/6472 . . . . { with elements of the scraper bowls being pivotable for dumping the soil (E02F 3/649 takes precedence; with an ejector having translational movement E02F 3/6481) }

E02F 3/6481 . . . . { with scraper bowls with an ejector having translational movement for dumping the soil (E02F 3/649 takes precedence) }

E02F 3/649 . . . . { with conveying means for emptying the scraper bowl }

E02F 3/65 . . . Component parts, e.g. drives, control devices

E02F 3/651 . . . . { Hydraulic or pneumatic drives; Electric or electro-mechanical control devices (E02F 3/652, E02F 3/653 take precedence) }

E02F 3/652 . . . . { Means to adjust the height of the scraper bowls, e.g. suspension means, tilt control, earth damping control }

E02F 3/653 . . . . { Connection mechanisms to the main body of the machine (connection of tools to dipper-arms, booms, bucket-arms E02F 3/3604; connection of beams or booms or arms to tractors in general E02F 3/627) }

E02F 3/654 . . . . { Scraper bowls and components mounted on them }

E02F 3/655 . . . . . { Loading or elevator mechanisms (Loading devices for excavators in general E02F 7/04) }

E02F 3/656 . . . . . { Ejector or dumping mechanisms (for buckets mounted on a dipper-arm or bucket arms E02F 3/407) }

E02F 3/657 . . . . . { Means to prevent the spilling of dredged material, e.g. apron, baffle }

E02F 3/658 . . . . . { Cutting edge (for graders or bulldozer blades E02F 3/8152, E02F 3/8155; teeth per se E02F 9/28) }

E02F 3/659 . . . . . { Conveying means for emptying scraper bowls (conveying equipment for excavators in general E02F 7/02) }

E02F 3/76 . . Graders, bulldozers, or the like with scraper plates or ploughshare-like elements (soil-working A01B) ; Levelling { scarifying } devices { (street cleaning E01H ; construction of roads E01C19, E01C23) }

E02F 3/7604	. . .	{Combinations of scraper blades with soil loosening tools working independently of scraper blades (soil loosening attachments fixed on blades E02F 3/8152, E02F 3/8155) }
E02F 3/7609	. . .	{Scraper blade mounted forwardly of the tractor on a pair of pivoting arms which are linked to the sides of the tractor, e.g. bulldozers }
E02F 3/7613	. . . .	{with the scraper blade adjustable relative to the pivoting arms about a vertical axis, e.g. angle dozers }
E02F 3/7618	. . . .	{with the scraper blade adjustable relative to the pivoting arms about a horizontal axis }
E02F 3/7622	. . .	{Scraper equipment with the scraper blade mounted on a frame to be hitched to the tractor by bars, arms, chains or the like, the frame having no ground supporting means of its own, e.g. drag scrapers }
E02F 3/7627	. . . .	{with the scraper blade adjustable relative to the frame about a vertical axis }
E02F 3/7631	. . . .	{with the scraper blade adjustable relative to the frame about a horizontal axis }
E02F 3/7636	. . .	{Graders with the scraper blade mounted under the tractor chassis }
E02F 3/764	. . . .	{with the scraper blade being pivotable about a vertical axis }
E02F 3/7645	. . . .	{with the scraper blade being pivotable about a horizontal axis disposed parallel to the blade }
E02F 3/765	. . . .	{with the scraper blade being pivotable about a horizontal axis disposed perpendicular to the blade }
E02F 3/7654	. . . .	{with the scraper blade being horizontally movable into a position near the chassis }
E02F 3/7659	. . . .	{with the vertical centre-line of the scraper blade disposed laterally relative to the central axis of the chassis }
E02F 3/7663	. . .	{Graders with the scraper blade mounted under a frame supported by wheels, or the like }
E02F 3/7668	. . . .	{with the scraper blade being pivotable about a vertical axis }
E02F 3/7672	. . . .	{with the scraper blade being pivotable about a horizontal axis disposed parallel to the blade }
E02F 3/7677	. . . .	{with the scraper blade being pivotable about a horizontal axis disposed perpendicular to the blade }
E02F 3/7681	. . . .	{with the scraper blade being horizontally movable into a position near the frame }
E02F 3/7686	. . . .	{with the vertical centre-line of the scraper blade disposed laterally relative to the central axis of the frame }
E02F 3/769	. . .	{Graders, bulldozers, or the like comprising loaders }
E02F 3/7695	. . .	{ Graders, bulldozers or the like comprising elevators or conveyers }
E02F 3/78	. . .	with rotating digging elements
E02F 3/783	. . . .	{ having a horizontal axis of rotation }
E02F 3/786	. . . .	{ having a vertical axis of rotation }
E02F 3/80	. . .	Component parts
E02F 3/815	. . . .	Blades; Levelling {or scarifying }tools { (E02F 3/40 takes precedence) }
E02F 3/8152	. . . . .	{ Attachments therefor, e.g. wear resisting parts, cutting edges (E02F 3/8155, E02F 3/8157 take precedence; teeth per se E02F 9/28) }
E02F 3/8155	. . . . .	{provided with movable parts, e.g. cutting discs, vibrating teeth or the like }
E02F 3/8157	. . . . .	{Shock absorbers; Supports, e.g. skids, rollers; Devices for compensating

wear-and-tear, or the like }

E02F 3/84 . . . . Drives or control devices therefor, { e.g. hydraulic drive systems }

E02F 3/841 . . . . . { Devices for controlling and guiding the whole machine, e.g. by feeler elements and reference lines placed exteriorly of the machine (construction of roads E01C 19/008) }

E02F 3/842 . . . . . {using electromagnetic, optical or photoelectric beams, e.g. laser beams }

E02F 3/844 . . . . . {for positioning the blade, e.g. hydraulically }

E02F 3/845 . . . . . {using mechanical sensors to determine the blade position, e.g. inclinometers, gyroscopes, pendulums }

E02F 3/847 . . . . . {using electromagnetic, optical or acoustic beams to determine the blade position, e.g. laser beams }

E02F 3/848 . . . . . {using cable drums }

E02F 3/88 . . with arrangements acting by a sucking or forcing effect, e.g. suction dredgers (pumps in general F04)

E02F 3/8808 . . . { Stationary installations, e.g. installations using spuds or other stationary supports (spuds on floating substructures per se E02F 9/062; cleaning the beds of waterways E02B 3/02) }

E02F 3/8816 . . . {Mobile land installations }

E02F 3/8825 . . . . {wherein at least a part of the soil-shifting equipment is mounted on a dipper-arm, backhoes or the like }

E02F 3/8833 . . . { Floating installations (floating substructures per se E02F 9/06) }

E02F 3/8841 . . . . {wherein at least a part of the soil-shifting equipment is mounted on a ladder or boom }

E02F 3/885 . . . . {self propelled, e.g. ship }

E02F 3/8858 . . . {Submerged units (self propelled units for burying conduits or cables in trenches under water E02F 5/105) }

E02F 3/8866 . . . . {self propelled }

E02F 3/8875 . . . . {pulled or pushed }

E02F 3/8883 . . . {Using the force of explosions, e.g. by the use of internal combustion engines }

E02F 3/8891 . . . {wherein at least a part of the soil-shifting equipment is handheld }

E02F 3/90 . . . Component parts {e.g. arrangement or adaptation of pumps }

E02F 3/902 . . . . { for modifying the concentration of the dredged material, e.g. relief valves preventing the clogging of the suction pipe }

E02F 3/905 . . . . { Manipulating or supporting suction pipes or ladders; Mechanical supports or floaters therefor; pipe joints for suction pipes (for heave compensation E02F 9/067 takes precedence; pipelines per se E02F 7/10; joints for pipes in general F16L) }

E02F 3/907 . . . . { Measuring or control devices, e.g. control units, detection means or sensors (E02F 3/902 takes precedence) }

E02F 3/92 . . . . Digging elements, e.g. suction heads

E02F 3/9206 . . . . . { Digging devices using blowing effect only, like jets or propellers (E02F 5/107 takes precedence; passive suction heads with jets E02F 3/925; active suction heads with jets E02F 3/9262; drilling by jets E21B 7/18; slitting by jets E21C 25/60) }

E02F 3/9212 . . . . . { Mechanical digging means, e.g. suction wheels, i.e. wheel with a suction inlet attached behind the wheel (E02F 3/9287 takes precedence; Active suction heads E02F 3/9256) }

E02F 3/9218 . . . . . { with jets }

E02F 3/9225 . . . . . { with rotating cutting elements }

E02F 3/9231 . . . . . { Suction wheels with axis of rotation parallel to longitudinal axis of the suction pipe }

E02F 3/9237 . . . . . { Suction wheels with axis of rotation in transverse direction of the longitudinal axis of the suction pipe }

E02F 3/9243 . . . . . { Passive suction heads with no mechanical cutting means (E02F 5/108 takes precedence) }

E02F 3/925 . . . . . {with jets }

E02F 3/9256 . . . . . { Active suction heads; Suction heads with cutting elements, i.e. the cutting elements are mounted within the housing of the suction head (E02F 5/108 takes precedence) }

E02F 3/9262 . . . . . {with jets }

E02F 3/9268 . . . . . {with rotating cutting elements }

E02F 3/9275 . . . . . {with axis of rotation parallel to longitudinal axis of the suction pipe }

E02F 3/9281 . . . . . {with axis of rotation in horizontal and transverse direction of the suction pipe }

E02F 3/9287 . . . . . {Vibrating suction heads }

E02F 3/9293 . . . . . {Component parts of suction heads, e.g. edges, strainers for preventing the entry of stones or the like }

E02F 3/94 . . . . Apparatus for separating stones from the dredged material, {i.e. separating or treating dredged material (screening plants mounted on dredger therefor E02F 7/06) }

E02F 3/945 . . . . . {for environmental purposes }

E02F 3/96 . . with arrangements for alternate { or simultaneous } use of different digging elements { (E02F 3/7604, E02F 3/769, E02F 3/78 take precedence; quick-acting devices to connect tools to arms or booms E02F 3/3609, for arms to tractors or the like E02F 3/627) }

E02F 3/961 . . . { with several digging elements or tools mounted on one machine (for backhoes E02F 3/964 takes precedence) }

E02F 3/962 . . . {Mounting of implements directly on tools already attached to the machine (E02F 3/404 and E02F 3/8152 take precedence) }

E02F 3/963 . . . { Arrangements on backhoes for alternate use of different tools (backhoes per se E02F 3/30; quick-acting devices to connect tools to arms E02F 3/3609, for arms to tractors or the like E02F 3/627) }

E02F 3/964 . . . . { of several tools mounted on one machine (E02F 3/962 takes precedence) }

E02F 3/965 . . . { of metal-cutting or concrete-crushing implements (shearing devices B23D 17/00; wrecking of buildings, e.g. tools therefor, E04F 23/08) }

E02F 3/966 . . . { of hammer-type tools (arrangements for breaking-up hard ground E02F 5/305; percussion -type rippers E02F 5/323) }

E02F 3/967 . . . { of compacting-type tools (compacting tools in combination with special-purpose dredges or soil-shifting machines E02F 5/30) }

E02F 3/968 . . . {Storing, handling or otherwise manipulating tools when detached from the machine (E02F 3/6273 takes precedence) }

E02F 5/00 Dredgers or soil-shifting machines for special purposes

E02F 5/003 . {for uncovering conduits }

E02F 5/006 . { adapted for working ground under water not otherwise provided for (E02F 3/081, E02F 3/4131, E02F 3/8833, E02F 5/104, E02F 5/125, E02F 7/005, E02F 7/023, E02F 7/065, E02F 9/026, E02F 9/045, E02F 9/06 take precedence) }

E02F 5/02 . for digging trenches or ditches ({ machines for making foundation slots E02F 3/205, E02F 3/475 take precedence }; agricultural ploughs for working ridges A01B 13/02)

E02F 5/022 . . {with tools digging laterally with respect to the frame }

E02F 5/025 . . {with scraper-buckets, dippers or shovels }

E02F 5/027 . . { with coulters, ploughs, scraper plates, or the like (E02F 5/102, E02F 5/103, E02F 5/106 take precedence) }

E02F 5/04 . . with digging screws { (E02F 5/109 takes precedence; with digging screws per se E02F 3/06) }

E02F 5/06 . . with digging elements mounted on an endless chain { (E02F 5/109 takes precedence; with digging elements mounted on an endless chain per se E02F 3/08) }

E02F 5/08 . . with digging wheels turning round an axis { (E02F 5/109 takes precedence; with digging wheels per se E02F 3/18) }

E02F 5/10 . . with arrangements for reinforcing trenches or ditches; with arrangements for making or assembling conduits or for laying conduits or cables (laying pipes per se F16L 1/00, making pipes in situ F16L 1/038; laying electric cables per se H02G 1/06; { drainage device- laying apparatus E02B 11/02 })

E02F 5/101 . . . {forming during digging, e.g. underground canalisations or conduits, by bending or twisting a strip of pliable material; by extrusion }

E02F 5/102 . . . {operatively associated with mole-ploughs, coulters (rippers E02F 5/32) }

E02F 5/103 . . . . {with oscillating or vibrating digging tools }

E02F 5/104 . . . {for burying conduits or cables in trenches under water (floating substructures per se E02F 9/06) }

E02F 5/105 . . . . {self-propulsed units moving on the underwater bottom }

E02F 5/106 . . . . { using ploughs, coulters, rippers }

E02F 5/107 . . . . { using blowing-effect devices, e.g. jets (digging devices using a blowing effect per se E02F 3/9206) }

E02F 5/108 . . . . { using suction-effect devices (suction heads per se E02F 3/9243, E02F 3/9256) }

E02F 5/109 . . . . { using rotating digging elements (rotating digging elements per se E02F 3/18) }

E02F 5/12 . . with equipment for back-filling trenches or ditches

E02F 5/125 . . . {underwater }

E02F 5/14 . . Component parts for trench excavators, e.g. indicating devices {travelling gear chassis, supports, skids }

E02F 5/145 . . . {control and indicating devices }

E02F 5/16 . Machines for digging other holes in the soil (earth drilling E21)

E02F 5/18 . . for horizontal holes { or inclined holes }

E02F 5/20 . . for vertical holes

E02F 5/22 . for making embankments; for back-filling (in combination with trench excavators E02F 5/12)

E02F 5/223 . . {for back-filling (in association with trench excavators E02F 5/12) }

E02F 5/226 . . . {with means for processing the soil, e.g. screening belts, separators; Padding machines }

E02F 5/24 . . Depositing dredged material in mounds

E02F 5/26 . . Combined conveying-bridges and dredgers

E02F 5/28 . for cleaning watercourses or other ways { (stream regulation E02B 3/02) }

E02F 5/282 . . {with rotating cutting or digging tools }

E02F 5/285 . . {with drag buckets or scraper plates }

E02F 5/287 . . { with jet nozzles (digging devices with blowing effect per se E02F 3/9206) }

E02F 5/30 . Auxiliary apparatus, e.g. for tawing, craking, blowing-up, or other preparatory treatment of the soil

E02F 5/305 . . { Arrangements for breaking-up hard ground (E02F 5/32 takes precedence; hammer-type tools E02F 3/966; breaking-up paving of roads or the like E01C 23/12; breaking-up subaqueous rock E02B 3/02) }

E02F 5/32 . . Rippers { (E02F 5/106 takes precedence, ripper or scarifying teeth mounted on blades E02F 3/8152; ripper tips E02F 9/2875) }

E02F 5/323 . . . {Percussion-type rippers }

E02F 5/326 . . . {oscillating or vibrating }

E02F 7/00 **Equipment for conveying or separating excavated material** (barges adapted for carrying-away material from floating dredgers B63B 35/28)

E02F 7/005 . {conveying material from the underwater bottom (by pipelines E02F 7/10; suction dredgers E02F 3/88) }

E02F 7/02 . Conveying equipment mounted on dredgers or excavators (conveyers in general B65G) { (in combination with graders or bulldozers E02F 3/7695; in combination with rotating digging wheels E02F 3/181; in combination with bucket-arms E02F 3/348; in combination with digging elements mounted on an endless chain E02F 3/082, E02F 3/083) }

E02F 7/023 . . {mounted on a floating dredger }

E02F 7/026 . . {mounted on machines equipped with dipper- or bucket-arms }

E02F 7/04 . Loading devices mounted on a dredger or an excavator (loading devices in general B65G) {hopper dredgers, also equipment for unloading the hopper }

E02F 7/06 . Delivery chutes or screening plants { or mixing plants } mounted on dredgers or excavators ({ for back-filling E02F 5/226 takes precedence }; separating equipment in general B03 ; delivery chutes in general B65G)

E02F 7/065 . . {mounted on a floating dredger }

E02F 7/10 . Pipelines for conveying excavated materials (pipes in general F16L ; pipe-lines systems F17D) {conveying by liquid pressure B65G 53/30 }

E02F 9/00 **Component parts of dredgers or soil-shifting machines, not restricted to one of the kinds covered by groups E02F 3/00 to E02F 7/00** (laying-out or take-up devices for trailing electric cables B66C)

E02F 9/003 . {Devices for transporting the soil-shifting machines or excavators, e.g. by pushing them or by hitching them to a tractor }

E02F 9/006 . {Pivot joint assemblies (in general F16C 11/04) }

E02F 9/02 . Travelling-gear, e.g. associated with slewing gears ({drives therefor E02F 9/20 }; for motor vehicles B60B , G; undercarriages for locomotives or rail-road cars B61F ; track-laying vehicles B62D ; for cranes B66C 23/18)

E02F 9/022 . . {for moving on rails }

E02F 9/024 . . {with laterally or vertically adjustable wheels or tracks (for vehicles in general B60B 35/10; B62D 55/084) }

E02F 9/026 . . {for moving on the underwater bottom (marine propulsion by direct engagement with water-bed or ground B63H 19/08) }

E02F 9/028 . . {with arrangements for levelling the machine (hydraulic drives therefor E02F 9/2257) }

E02F 9/04 . . Walking gears moving the dredger forward step-by-step

E02F 9/045 . . . [for moving on the underwater bottom (for artificial islands E02B 17/022; marine propulsion by direct engagement with water-bed or ground B63H 19/08)]

E02F 9/06 . Floating substructures as supports { (floating installations with arrangements acting by a sucking or forcing effect E02F 3/8833) }

E02F 9/062 . . {Advancing equipment, e.g. spuds for floating dredgers }

E02F 9/065 . . . {characterised by the use of lines with anchors and winches }

E02F 9/067 . . {with arrangements for heave compensation (for drilling structures E21B 19/09; for lifting devices B66C 13/02) }

E02F 9/08 . Superstructures; Supports for superstructures { (arrangements for travelling gear, e.g. undercarriages for wheels, crawlers, caterpillars E02F 9/02; for motor vehicles B62D 25/00, B62D 33/00) }

E02F 9/0808 . . { Improving mounting or assembling, e.g. frame elements, disposition of all the components on the superstructures (for disposition of specific components, E02F 9/0858) }

E02F 9/0816 . . . { Welded frame structure }

E02F 9/0825 . . . { Cast frame structure }

E02F 9/0833 . . { Improving access, e.g. for maintenance, steps for improving driver's access, handrails }

E02F 9/0841 . . {Articulated frame, i.e. having at least one pivot point between two travelling gear units (tractor-trailer combinations B62D 53/00) }

E02F 9/085 . . { Ground-engaging fitting for supporting the machines while working, e.g. outriggers, legs (for vehicles in general B60S 9/00, for cranes B66C 23/78) }

E02F 9/0858 . . { Arrangement of component parts installed on superstructures not otherwise provided for, e.g. electric components, fenders, air-conditioning units (E02F 9/16, E02F 9/18 take precedence) }

E02F 9/0866 . . . { Engine compartment, e.g. heat exchangers, exhaust filters, cooling devices, silencers, mufflers, position of hydraulic pumps in the engine compartment }

E02F 9/0875 . . . { Arrangement of valve arrangements on superstructures (arrangement of hydraulic hoses E02F 9/2275 takes precedence; valves per se E02F 9/2267) }

E02F 9/0883 . . . { Tanks, e.g. oil tank, urea tank, fuel tank (for vehicles in general B60K15) }

E02F 9/0891 . . . { Lids or bonnets or doors or details thereof (doors for cabins E02F 9/163 takes precedence; for motor vehicles B62D 25/10) }

E02F 9/10 . . Supports for movable superstructures mounted on travelling or walking gears or on other superstructures

E02F 9/12 . . . Slewing or traversing gears (roller and ball bearings F16C)

E02F 9/121 . . . . { Turntables, i.e. structure rotatable about 360? }

E02F 9/123 . . . . . { Drives or control devices specially adapted therefor (E02F 9/125 and E02F 9/128 take precedence) }

E02F 9/125 . . . . . { Locking devices }

E02F 9/126 . . . . . { Lubrication systems }

E02F 9/128 . . . . . { Braking systems }

E02F 9/14 . Booms { only for booms with cable suspension arrangements (for booms or manipulators with cable suspensions for suction pipes E02F 3/905 takes precedence; for booms per se E02F 3/38; E02F 3/34 for bucket-arms) }; Cable suspensions

E02F 9/16 . Cabins, platforms, or the like, for drivers ({ for motor vehicles in general B62D 33/06 }, for cranes B66C 13/54)

E02F 9/163 . . { Structures to protect drivers, e.g. cabins, doors for cabins; Falling object protection structure (FOPS); Roll over protection structure (ROPS) (for handrails mounted on cabins E02F 9/0833 takes precedence; for vehicles in general B60R 21/11, B60R 21/13, for fork-lift trucks B66F 9/07545) }

E02F 9/166 . . { movable, tiltable or pivoting, e.g. movable seats, dampening arrangements of cabins (seats for vehicles in general B60N2) }

E02F 9/18 . Counterweights { (for cranes B66C 23/72, for tractors B62D 49/085) }

E02F 9/20 . Drives; Control devices (gearings in general F16H ; controlling in general G05 ; electric multi-motor drives H02K , H02P)

E02F 9/2004 . . {Control mechanisms, e.g. control levers (control levers per se G05G) }

E02F 9/2008 . . . { Control mechanisms in the form of the machine in the reduced scale model }

E02F 9/2012 . . . { Setting the functions of the control levers, e.g. changing assigned functions among operations levers, setting functions dependent on the operator or seat orientation }

E02F 9/2016 . . { Winches (winches per se B66D) }

E02F 9/202 . . { Mechanical transmission, e.g. clutches, gears (clutches per se F16D , gears per se F16H) }

E02F 9/2025 . . { Particular purposes of control systems not otherwise provided for (E02F 3/16, E02F 3/26, sub-groups of E02F 3/43, E02F 3/651, sub-groups of E02F 3/84, E02F 3/907, E02F 5/145 take precedence) }

E02F 9/2029 . . . { Controlling the position of implements in function of its load, e.g. modifying the attitude of implements in accordance to vehicle speed (control for hydraulic or pneumatic drives E02F 9/2203, E02F 9/2221 and E02F 9/2253 take precedence) }

E02F 9/2033 . . . { Limiting the movement of frames or implements, e.g. to avoid collision between implements and the cabin (sub-groups of E02F 3/431 of E02F 3/435 take precedence; for turntables E02F 9/123) }

E02F 9/2037 . . . {Coordinating the movements of the implement and of the frame }

E02F 9/2041 . . . { Automatic repositioning of implements, i.e. memorising determined positions of the implement (for dipper-arms or bucket-arms E02F 3/434, E02F 3/437, E02F 3/438, E02F 3/439 take precedence) }

E02F 9/2045 . . . { Guiding machines along a predetermined path (for graders E02F 3/841; machines for construction of roads E01C 19/004) }

E02F 9/205 . . . { Remotely operated machines, e.g. unmanned vehicles (E02F 3/8866 takes precedence) }

E02F 9/2054 . . . { Fleet management }

E02F 9/2058 . . { Electric or electro-mechanical or mechanical control devices of vehicle sub-units (for vehicles in general B60W) }

E02F 9/2062 . . . { Control of propulsion units (for control of the prime mover depending on the load in a hydraulic or pneumatic drive E02F 9/2246) }

E02F 9/2066 . . . . { of the type combustion engines }

E02F 9/207 . . . . { of the type electric propulsion units, e.g. electric motors or generators }

E02F 9/2075 . . . . { of the hybrid type (for vehicles in general B60W20) }

E02F 9/2079 . . . { Control of mechanical transmission (for hydrostatic transmission or hydraulic torque converter E02F 9/2253) }

E02F 9/2083 . . . { Control of vehicle braking systems }

E02F 9/2087 . . . { Control of vehicle steering (for steering with hydraulic or pneumatic drives E02F 9/225) }

E02F 9/2091 . . . { Control of energy storage means for electrical energy, e.g. battery or capacitors (energy recovery arrangements in hydraulic or pneumatic drives E02F 9/2217) }

E02F 9/2095 . . . { Control of electric, electro-mechanical or mechanical equipment not otherwise provided for, e.g. ventilators, electro-driven fans (control of hydraulic driven equipment E02F 9/22) }

E02F 9/22 . . Hydraulic or pneumatic drives { (for dipper or bucket arm position control E02F 3/43, for blade position control for graders E02F 3/844; for turntables E02F 9/121; for fork-lift trucks B66F 9/22) }

E02F 9/2203 . . . { Arrangements for controlling the attitude of actuators, e.g. speed, floating function }

E02F 9/2207 . . . . {for reducing or compensating oscillations }

E02F 9/221 . . . . {for generating actuator vibration (buckets with vibrating means E02F 3/405) }

E02F 9/2214 . . . . {for reducing the shock generated at the stroke end }

E02F 9/2217 . . . {with energy recovery arrangements, e.g. using accumulators, flywheels }

E02F 9/2221 . . . { Control of flow rate; Load sensing arrangements (E02F 9/2203 take precedence over E02F 9/2221) }

E02F 9/2225 . . . . {using pressure-compensating valves }

E02F 9/2228 . . . . . {including an electronic controller }

E02F 9/2232 . . . . {using one or more variable displacement pumps }

E02F 9/2235 . . . . . {including an electronic controller }

E02F 9/2239 . . . . {using two or more pumps with cross-assistance }

E02F 9/2242 . . . . . {including an electronic controller }

E02F 9/2246 . . . { Control of prime movers, e.g. depending on the hydraulic load of work tools }

E02F 9/225 . . . {Control of steering, e.g. for hydraulic motors driving the vehicle tracks (steering in general B62D) }

E02F 9/2253 . . . { Controlling the travelling speed of vehicles, e.g. adjusting travelling speed according to implement loads, control of hydrostatic transmission }

E02F 9/2257 . . . {Vehicle levelling or suspension systems (suspensions for vehicles in general B60G) }

E02F 9/226 . . . { Safety arrangements, e.g. hydraulic driven fans, preventing cavitation, leakage, overheating }

E02F 9/2264 . . . { Arrangements or adaptations of elements for hydraulic drives }

E02F 9/2267 .... { Valves or distributors (position of valves arrangements on upper-structures E02F 9/0875) }
E02F 9/2271 .... { Actuators and supports therefor and protection therefor }
E02F 9/2275 .... { Hoses and supports therefor and protection therefor }
E02F 9/2278 ... { Hydraulic circuits (not used) }
E02F 9/2282 .... { Systems using center bypass type changeover valves }
E02F 9/2285 .... { Pilot-operated systems }
E02F 9/2289 .... { Closed circuit }
E02F 9/2292 .... { Systems with two or more pumps }
E02F 9/2296 .... { Systems with a variable displacement pump }

E02F 9/24 . Safety devices {e.g. for preventing overload (E02F 9/226 takes precedence) }
E02F 9/245 .. {for preventing damage to underground objects during excavation, e.g. indicating buried pipes or the like (detection of pipes in the ground F16L 1/11) }

E02F 9/26 . Indicating devices { (E02F 5/145 takes precedence) }
E02F 9/261 .. { Surveying the work-site to be treated }
E02F 9/262 ... { with follow-up actions to control the work tool, e.g. controller }
E02F 9/264 .. { Sensors and their calibration for indicating the position of the work tool }
E02F 9/265 ... { with follow-up actions (e.g. control signals sent to actuate the work tool) }
E02F 9/267 .. { Diagnosing or detecting failure of vehicles }
E02F 9/268 ... { with failure correction follow-up actions }

E02F 9/28 . Small metalwork for digging elements, e.g. teeth { scraper bits (ploughs for agriculture A01B 15/00; teeth of harrows A01B 23/02) }
E02F 9/2808 .. {Teeth }
E02F 9/2816 ... {Mountings therefor }
E02F 9/2825 .... {using adapters }
E02F 9/2833 .... {Retaining means, e.g. pins }
E02F 9/2841 ..... {resilient }
E02F 9/285 ... {characterised by the material used }
E02F 9/2858 ... {characterised by shape }
E02F 9/2866 .. { for rotating digging elements (for milling machines B28D 1/186; for mining machines E21C 35/18) }
E02F 9/2875 .. {Ripper tips }
E02F 9/2883 .. { Wear elements for buckets or implements in general }
E02F 9/2891 .. {Tools for assembling or disassembling }