

E02F

DREDGING; SOIL-SHIFTING (winning peat [E21C 49/00](#))

Definition statement

This subclass/group covers:

- Primarily working vehicles or vessels (and occasionally stationary installations) for excavating or loosening earth and/or for moving loose earth on the ground or underwater, such as excavators, backhoes, loaders, graders, bulldozers, cable scrapers, bucket cars, suction dredgers, trenchers, and their methods of operation.
- In other rarer cases, similar working vehicles or vessels for working similarly on other materials, such as excavators with other kinds of tools such as breaking jaws, hammers, compactors, etc... instead of buckets, and such as rippers, and their methods of operation.
- Almost all the aspects of those particular working vehicles or vessels as defined above; the mechanical structures such as work implements, cabins, upper-structures, undercarriages, floating structures and drives: hydraulic, electric or in form of a combustion engine, and their control systems.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Tractors (e.g. implements, couplers for tools)	A01B
Harvesting (e.g. hydraulic drive systems)	A01D
Manipulators (e.g. arms, control systems)	B25J
Vehicles in general (e.g. propulsion units, control thereof)	B60
Motor vehicles (e.g. undercarriages, super structures, cabins)	B62D
Tractors	B62D 49/00
Cranes (e.g. grapples, counterweights, hydraulic drive systems)	B66C
Fork lift trucks (e.g. hydraulic drive)	B66F

systems)	
Machines for construction of roads (e.g. graders)	E01C 19/00 , E01C 21/00 , E01C 23/00
Street cleaning (e.g. graders for snow removal)	E01H
Stream regulation	E02B 3/02
Foundation slots, embankments	E02D
Drilling (e.g. particular work tools)	E21B
Mining (e.g. particular work tools)	E21C
Military vehicles (e.g. graders)	F41H
Control in general	G05

Special rules of classification within this subclass

Some applications relating to soil-shifting as such, are also of interest for their general aspects and need to be classified there in addition to the classification in [E02F](#). Examples are:

- hydraulic drive system, classification also in [F15B](#)
- combustion engine control, classification also in [F02D](#)
- joint control of different sub-units of vehicles in general, classification also in [B60K](#), [B60W](#)
- superstructures, cabins, classification also in [B62D 25/00](#) or [B62D 33/00](#)
- pivot joint, classification also in [F16C](#)
- gearings, classification also in [F16H](#).

Some documents (example: "working/industrial/construction machine such as excavators, cranes, fork lift trucks, tractors..."), with several application oriented disclosures, need to be classified in all the application subclasses (in the general subclass if appropriate, see paragraph above). Examples are:

- agricultural tractors or vehicles, classification also in [A01B](#)
- street cleaning (snow removal), classification also in [E01H](#) ([E01H 5/00](#))

- cranes, classification also in [B66C](#) (cranes with a beam or boom [B66C 23/00](#))
- fork lift trucks, classification also in [B66F](#).

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Work implement	those parts that actually carry out the work of shifting soil and are attached to the vehicle or vessel body. For example: boom + dipper-arm + bucket.
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E02F 1/00

General working methods with dredgers or soil-shifting machines (methods for making embankments [E02D 17/18](#) ; methods for mining [E21C](#))

Definition statement

This subclass/group covers:

This group has to be considered as residual to all the other groups and sub-groups of [E02F](#). This group is very rarely used to classify documents.

References relevant to classification in this group

This subclass/group does not cover:

Dredgers; Soil-shifting machines	E02F 3/00
Dredgers or soil-shifting machines for special purposes	E02F 5/00

E02F 3/00

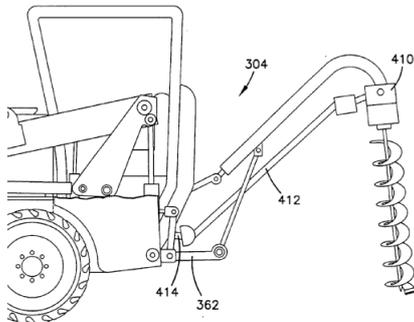
Dredgers; Soil-shifting machines (for special purposes [E02F 5/00](#) ; other machines or apparatus for mining [E21C](#); tunnelling [E21D](#))

Definition statement

This subclass/group covers:

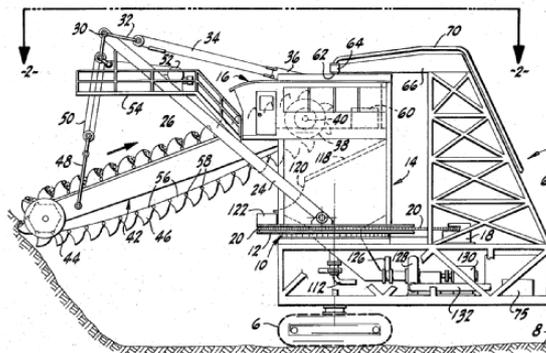
the following vehicles or vessels, with their corresponding methods, their particular components and the drives and control systems specially adapted for each of those particular vehicles:

With digging screws ([E02F 3/06](#))



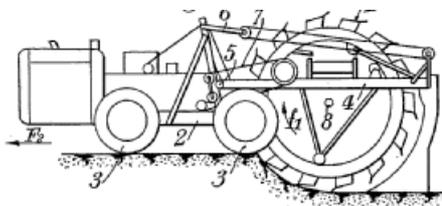
WO2004/043832

With digging elements on an endless chain ([E02F 3/08](#))



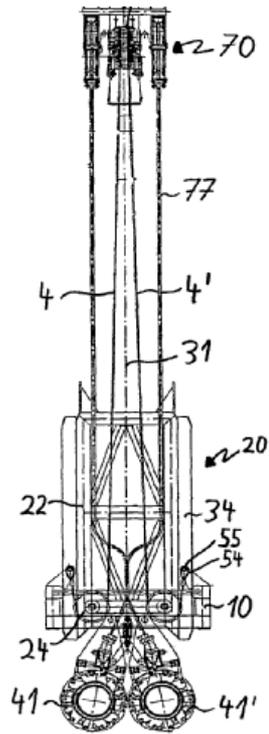
US3813125

With digging wheels turning round an axis ([E02F 3/18](#))



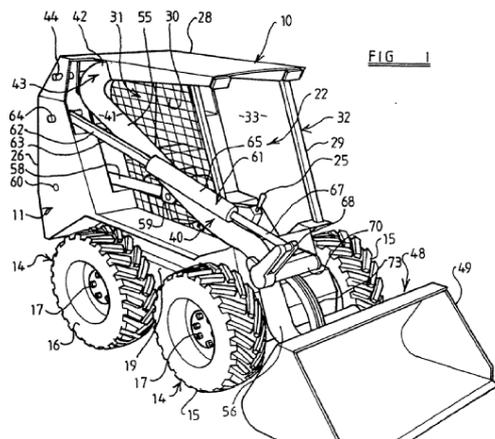
FR1267198

With a pair of digging wheels, slotting machines ([E02F 3/205](#))

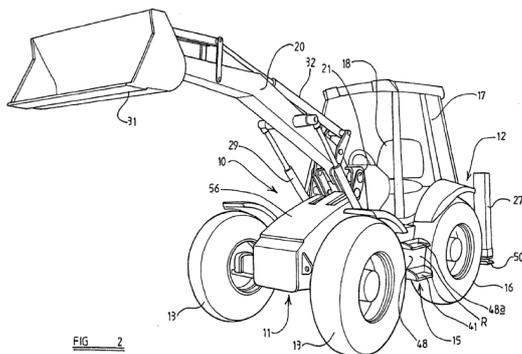


EP1630301

With digging tools mounted on a single (bucket-) arm ([E02F 3/283](#))

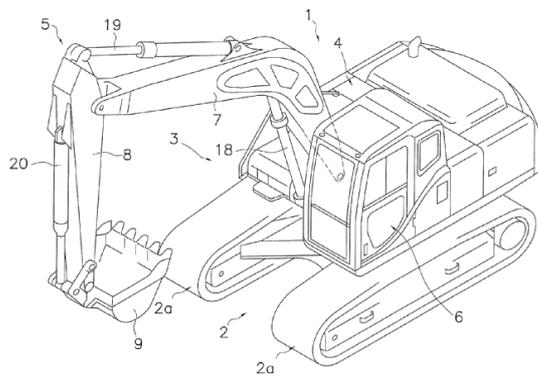


EP0445933



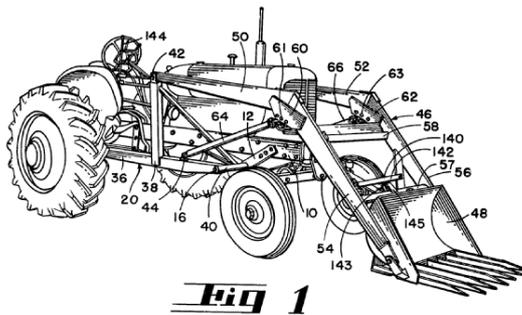
EP1294993

With digging tools mounted on a dipper-arm pivoted on a boom ([E02F 3/30](#))



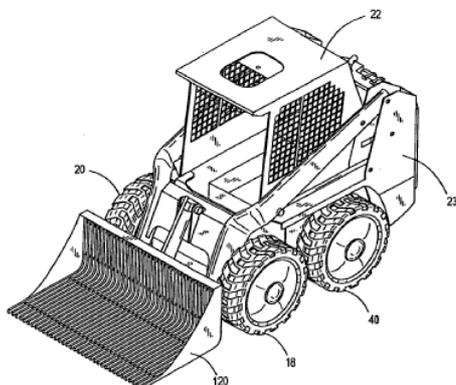
EP2141289

With digging tools mounted on a pair of bucket-arms ([E02F 3/34](#))



GB859309 (pair of arms - 50 and 52)

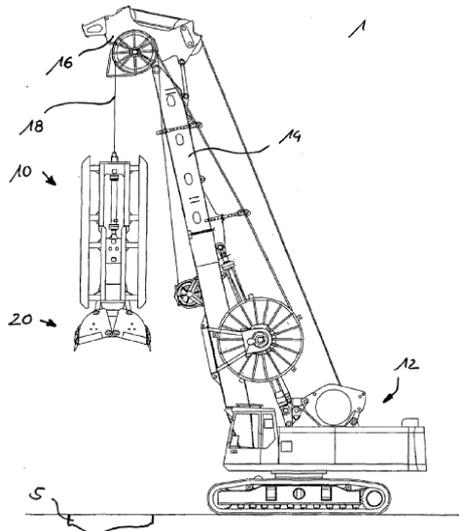
With bucket-arms being pivoted at the rear of the vehicle chassis, skid steer loader ([E02F 3/3414](#))



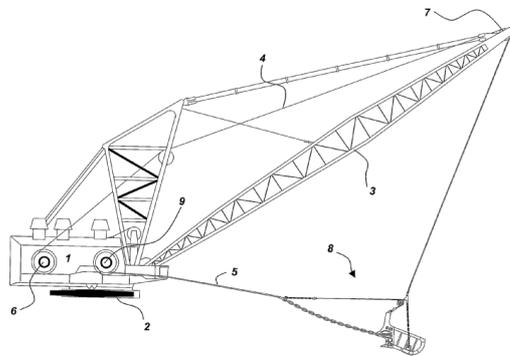
WO2009020509

With reciprocating digging or scraping elements moved by cables or hoisting ropes ([E02F 3/46](#)) with following subgroups:

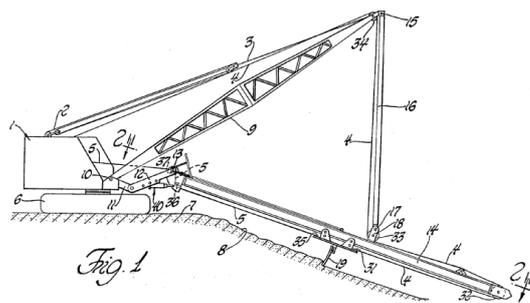
- with grab buckets for making foundation slots ([E02F 3/475](#))
- drag-lines ([E02F 3/48](#))
- with buckets or other digging elements moved along a rigid guideway ([E02F 3/50](#))
- cableway excavators ([E02F 3/52](#))



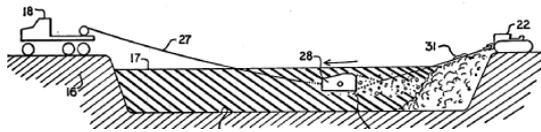
EP1950353



WO2004067856

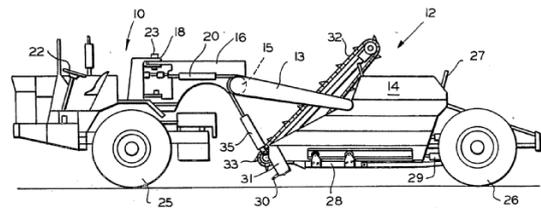


US4134221



US4184958

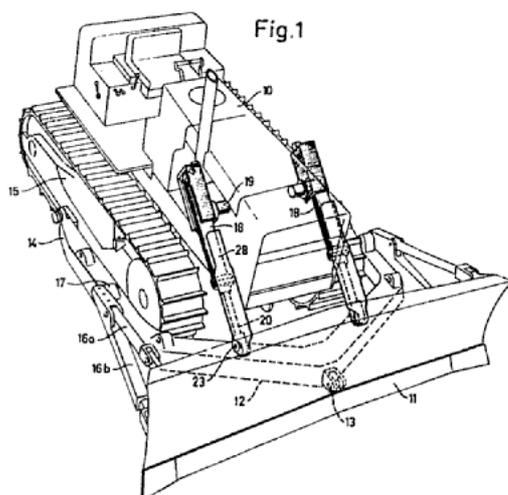
Bucket cars, i.e. having scraper bowls ([E02F 3/64](#))



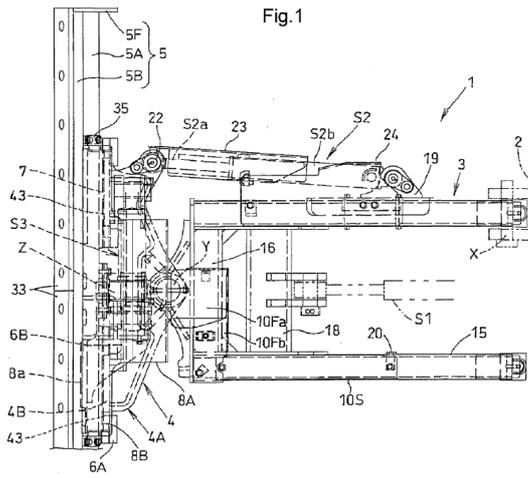
DE2352214

Graders, bulldozers ([E02F 3/76](#)) with the following subgroups:

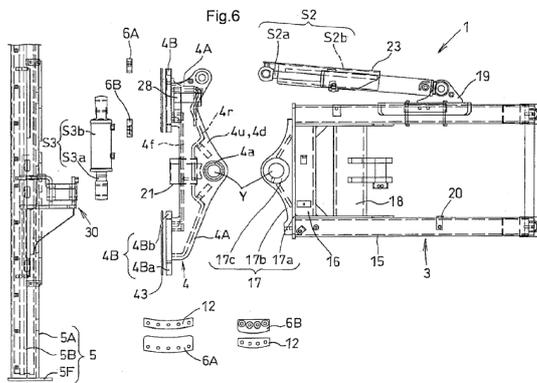
- with the scraper blade mounted forwardly of the tractor on a pair of pivoting arms which are linked to the side of the tractors ([E02F 3/7609](#))
- with the scraper blade mounted on a frame to be hitched to the tractor by bars, arms, chains or the like, the frame having no ground supporting means of its own ([E02F 3/7622](#))
- with the scraper blade mounted under the tractors chassis ([E02F 3/7636](#))
- with the scraper blade mounted under a frame supported by wheels (the frame being towed by a vehicle) ([E02F 3/7663](#))



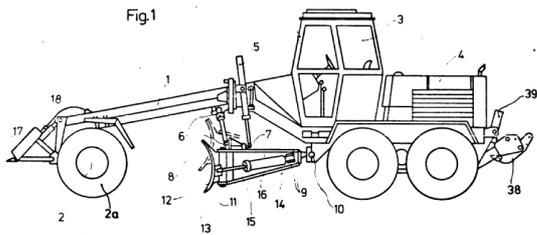
GB1080317



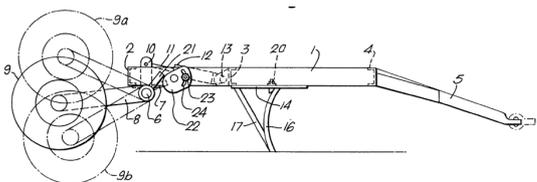
in exploded view



US2011067892 (arms 3, frame 4, blade 5)

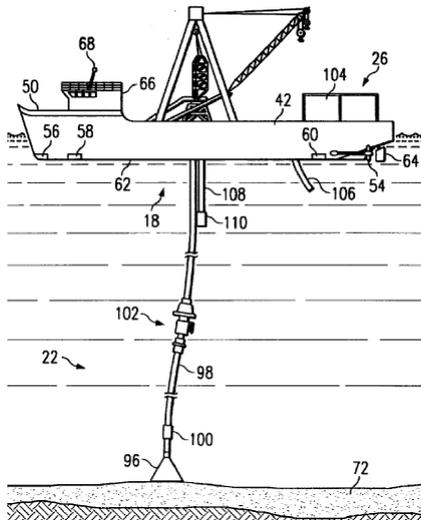


DE2707006

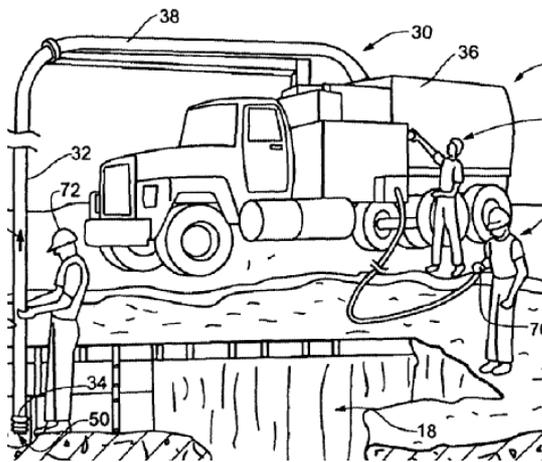


GB2065749

With arrangements acting by a sucking or forcing effect, e.g. suction dredgers
[\(E02F 3/88\)](#)



CA2285196



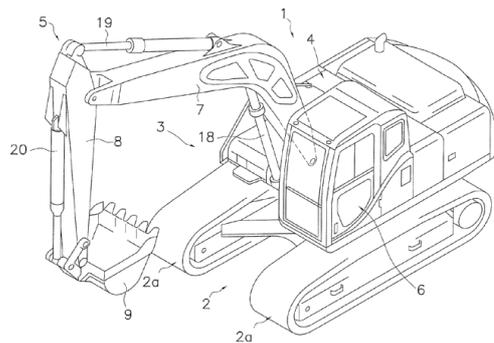
US6857207

Special rules of classification within this group

Boom or cantilever beam

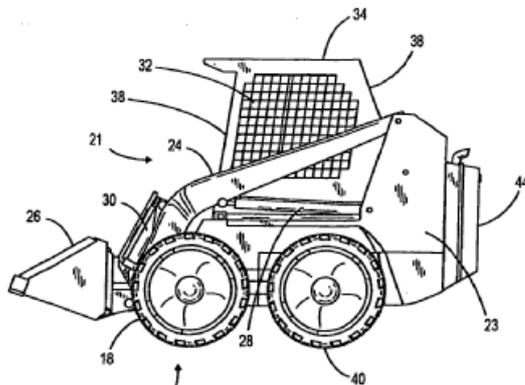
dipper-arm

bucket or shovel



EP2141289 (boom 7, dipper-arm 8, bucket 9)

Bucket-arm(s)



WO2009020509 (bucket-arm(s) 24 could be single or double, with one on the other side of the vehicle)

[E02F 3/02](#)

This subgroup is of rare use. The spades and rakes for agriculture or gardening purposes are to be classified in [A01B](#) and not in this subgroup. Some documents overlap with [E01H](#) (street cleaning) or other subclasses.

[E02F 3/205](#)

for machines specialised in making foundation slots or making walls of concrete in situ:

- if the machine alone is described, the document is to be classified only in [E02F 3/205](#).

- if the walls or foundations are defined and described too, the documents are also to be classified in [E02D 17/13](#) or [E02D 5/18](#).

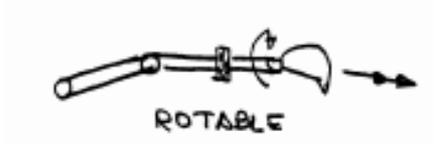
[E02F 3/301](#)



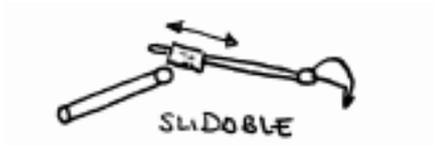
[E02F 3/302](#)



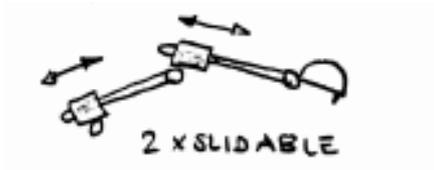
[E02F 3/303](#)



[E02F 3/304](#)



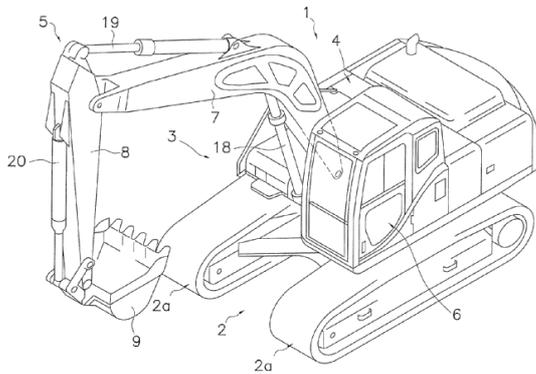
[E02F 3/305](#)



[E02F 3/306](#)

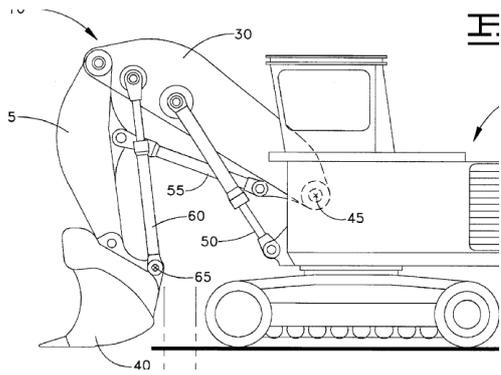


Backhoe, construction machines wherein the tool mounted at the end of the dipper-arm and boom is pulled towards the machine ([E02F 3/32](#))



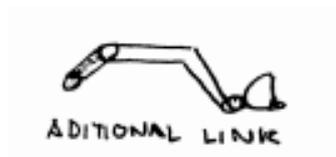
EP2141289

Machine with a dipper-arm and boom working outwardly ([E02F 3/308](#))

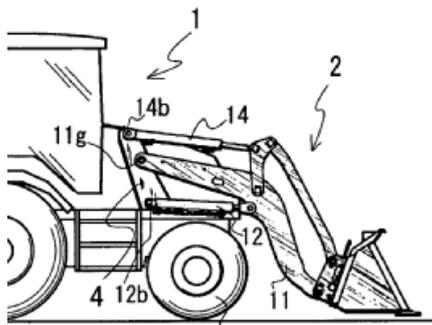


US6032093

[E02F 3/3405](#)

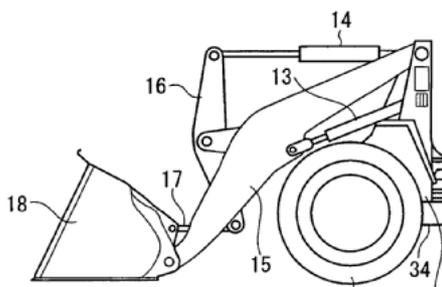


[E02F 3/3408](#)



EP1775389

[E02F 3/3411](#)

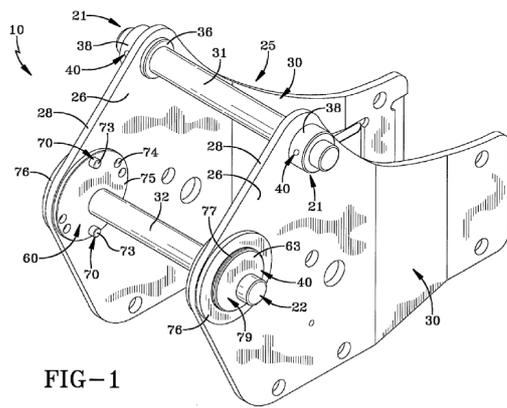


DE112007001547T

[E02F 3/36](#)

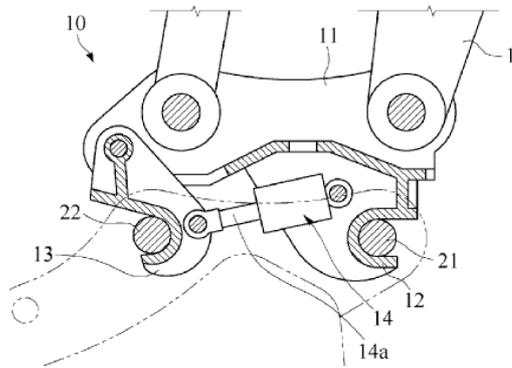
Classification in subgroup(s) of this group is preferred above classification in this group.

[E02F 3/3613](#)



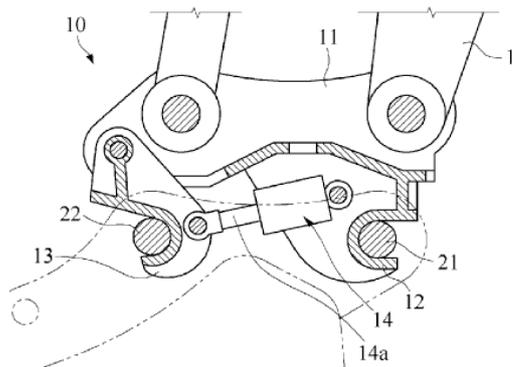
WO03069077 (assembly 60 - 63)

[E02F 3/3618](#)



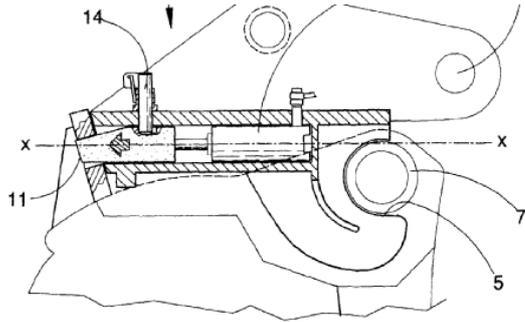
WO2011019143

[E02F 3/3622](#)



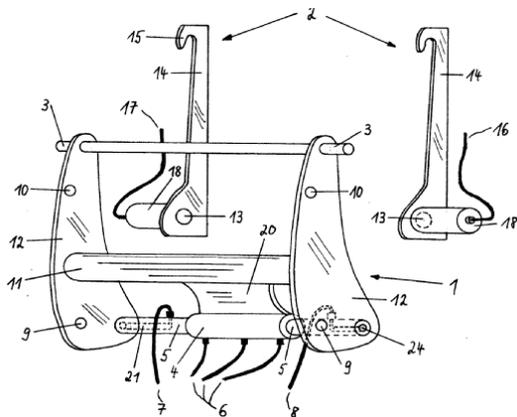
WO2011019143 (locking element - which is also a hook - 13 acts on the pin 22)

[E02F 3/3627](#)



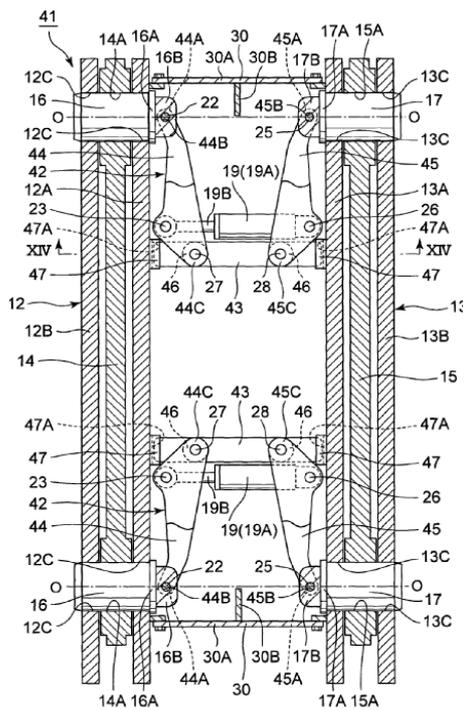
EP1033447 (longitudinal locking element 11)

[E02F 3/3631](#)



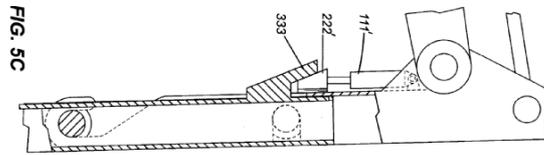
DE10200836 (hook 15 and transversal locking element 5 which enters 13 for locking)

[E02F 3/3636](#)



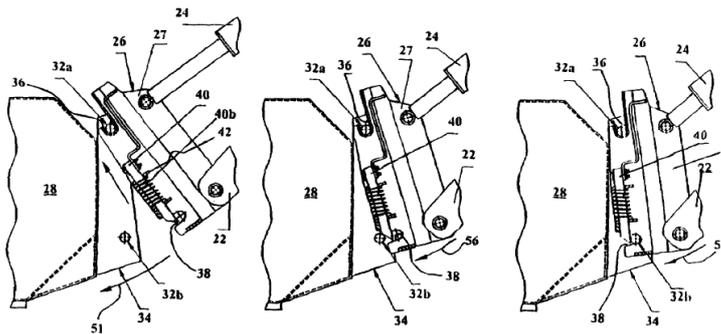
EP2206837 (four movable pins - 16, 17)

[E02F 3/364](#)



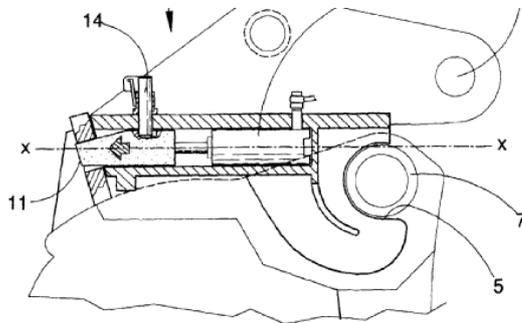
CA2546034 (wedge 222')

E02F3/36C20



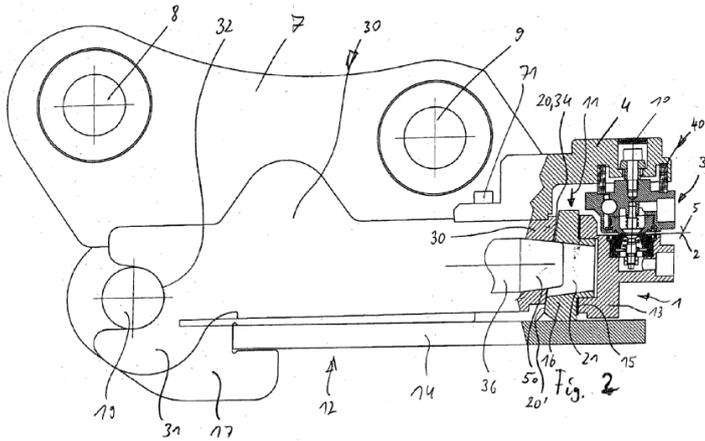
US7086821 (snap-on function of locking element 40 because of the spring)

[E02F 3/365](#)



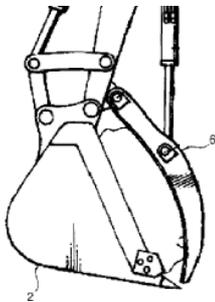
EP1033447 (first latching means 11 and second or redundant latching means 14)

[E02F 3/3654](#)



DE102004014823 (hydraulic lines couplers 40 - at the right of the picture)

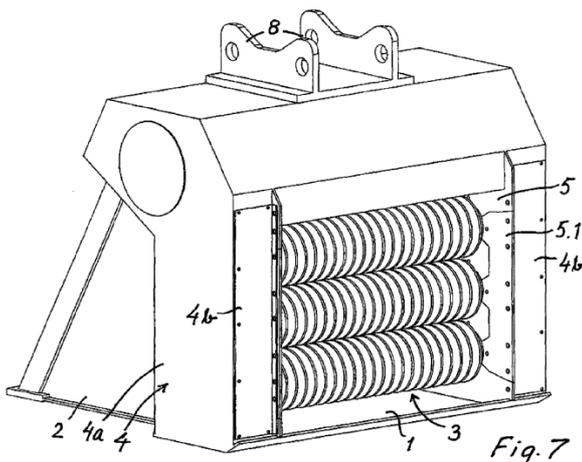
[E02F 3/404](#)



CN101268234

[E02F 3/407](#)

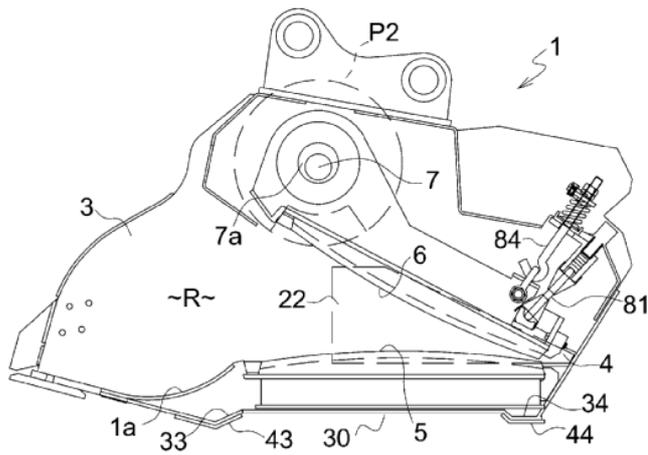
Buckets with integrated means for processing the soil are to be classified in [E02F 3/407](#) and [E02F 7/06](#), such as the following one:



EP2204501 (screening, crushing or mixing bucket)

Buckets with the particular integrated means "jaw crusher" for processing the soil are to be classified in [E02F 3/407](#) and [E02F 7/06](#) and [E02F 3/965](#), such

as the following one:

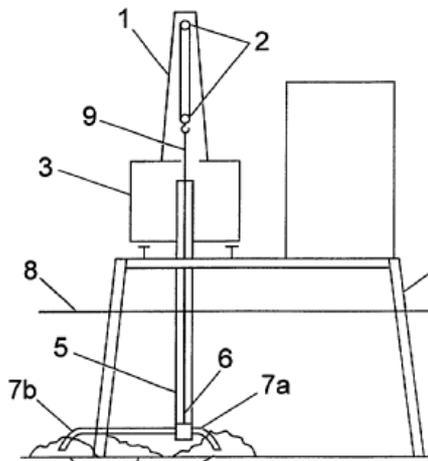


WO2011145233 (jaws 5 and 6)

[E02F 3/43](#)

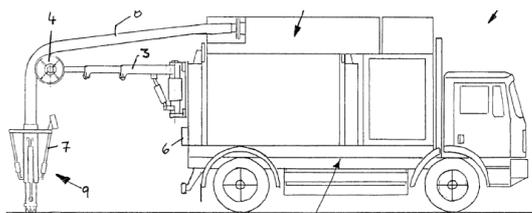
Classification in subgroup(s) of this group is preferred above classification in this group.

[E02F 3/8808](#)



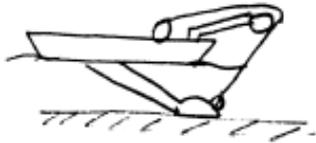
GB2349399

[E02F 3/8816](#)

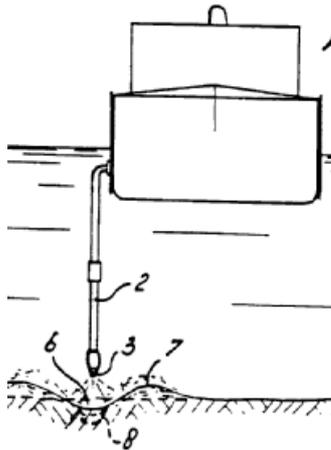


DE102004043081

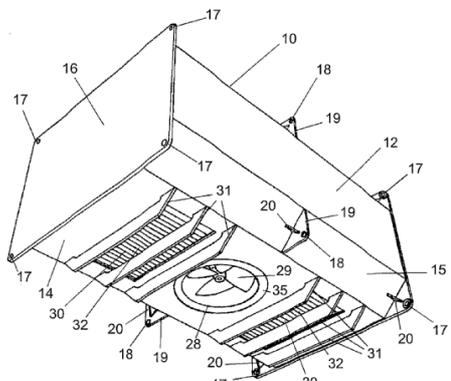
[E02F 3/905](#)



[E02F 3/9206](#)

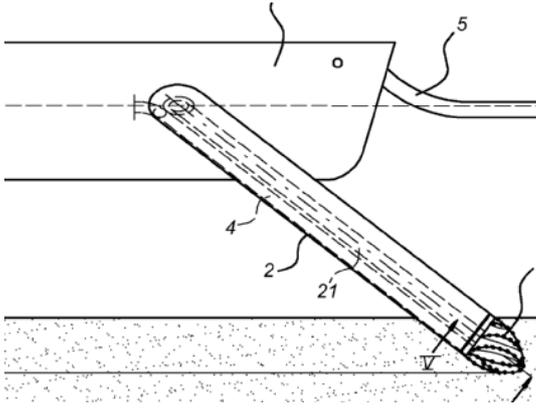


WO9527832 (with jets)



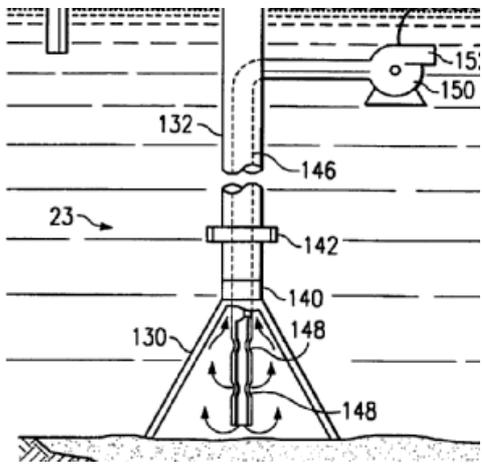
WO2004065700 (with propeller)

suction wheels ([E02F 3/9212](#) and subgroups)



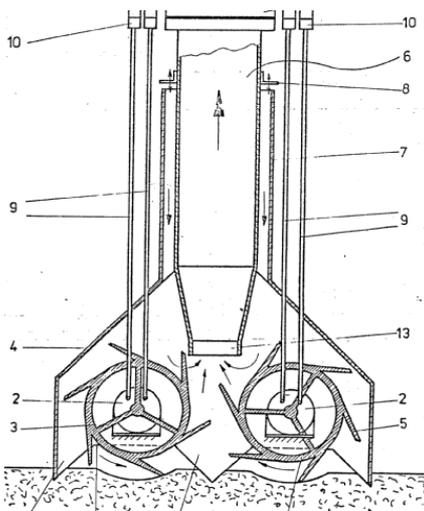
WO2007100250 (with suction pipe 4 behind the wheel)

[E02F 3/9243](#)



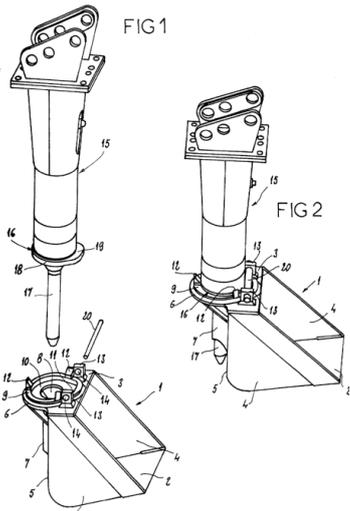
WO9844078 (suction head 130)

[E02F 3/9256](#)

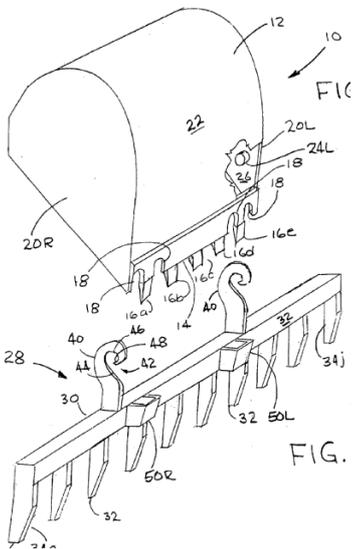


NL7905169

[E02F 3/962](#)

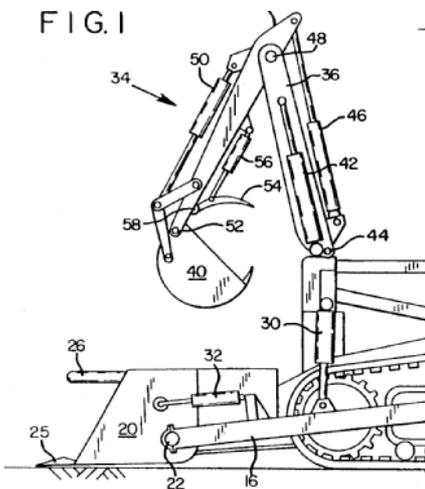


FR2866362



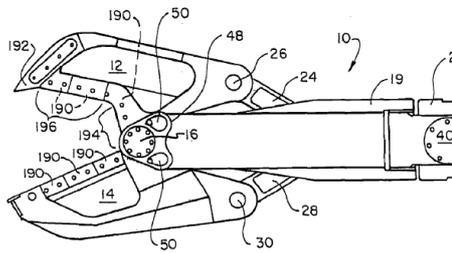
US2007289172

[E02F 3/964](#)



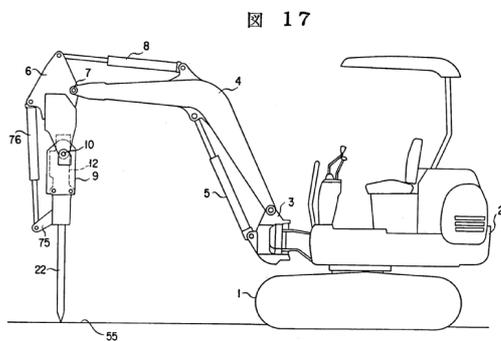
US5054958

[E02F 3/965](#)



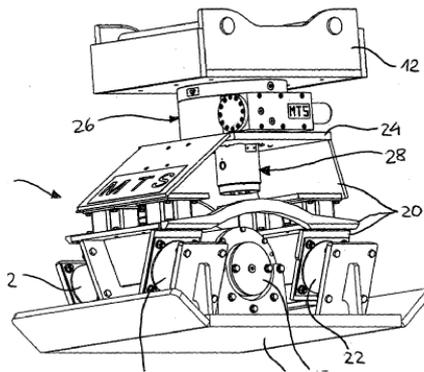
US2009008490

[E02F 3/966](#)



WO9824984

[E02F 3/967](#)



EP2123831

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Slidable vs telescopic ([E02F 3/304](#),
[E02F 3/305](#), [E02F 3/306](#))

- slidable: an arm or a boom glides or
slides as a whole piece along the axis

	<p>of a support- telescopic: an arm or a boom is composed of several elements sliding within each other so that the arm or boom becomes longer or shorter</p>
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E02F 5/00

Dredgers or soil-shifting machines for special purposes

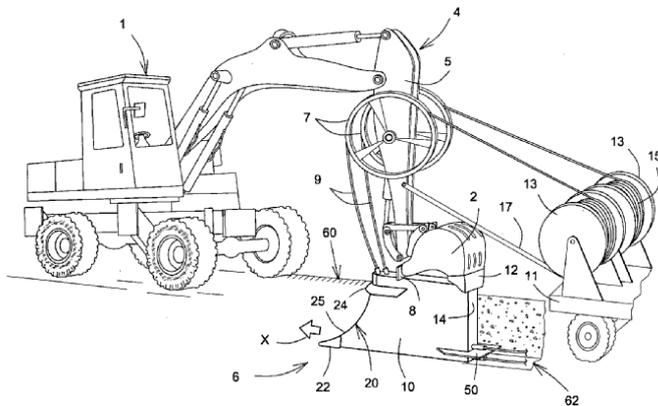
Definition statement

This subclass/group covers:

Machines used for uncovering conduits ([E02F 5/003](#))

Trenchers ([E02F 5/02](#) and subgroups)

- for laying cables ([E02F 5/101](#))

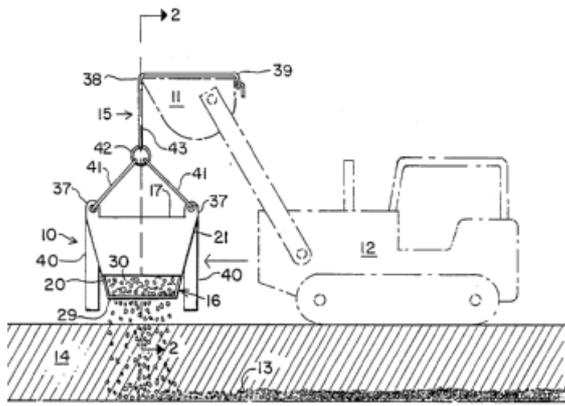


US2007286681

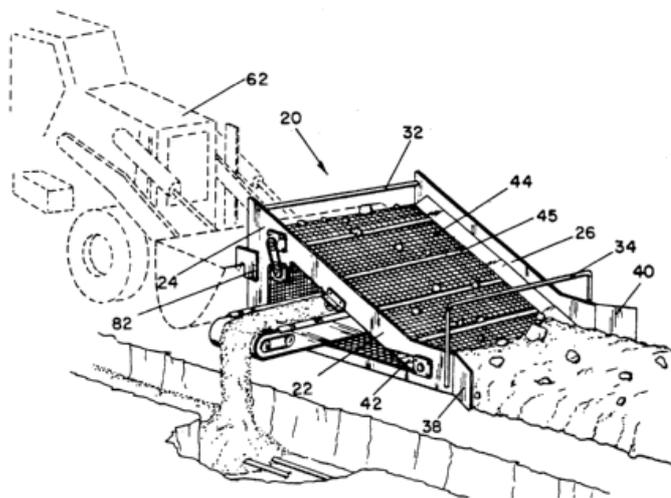
Machines for making embankments or backfilling ([E02F 5/22](#))

- for backfilling only ([E02F 5/223](#))

- with means for processing the soil ([E02F 5/226](#))

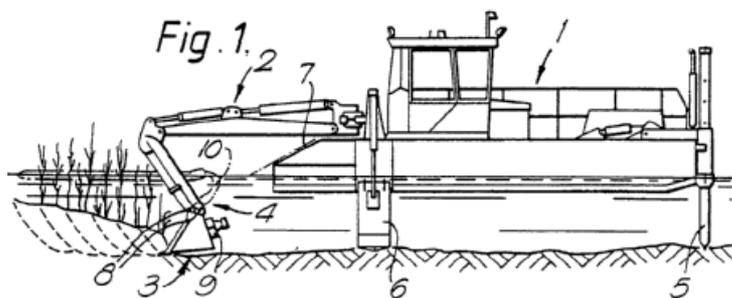


US4782606

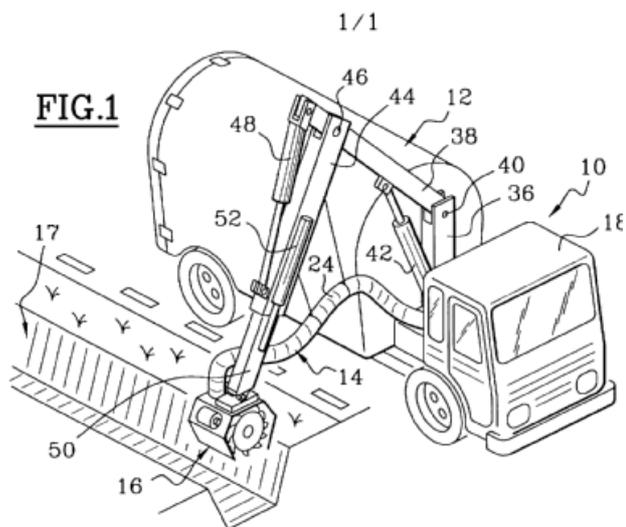


US5097610

Machines for cleaning watercourses or other ways ([E02F 5/28](#))

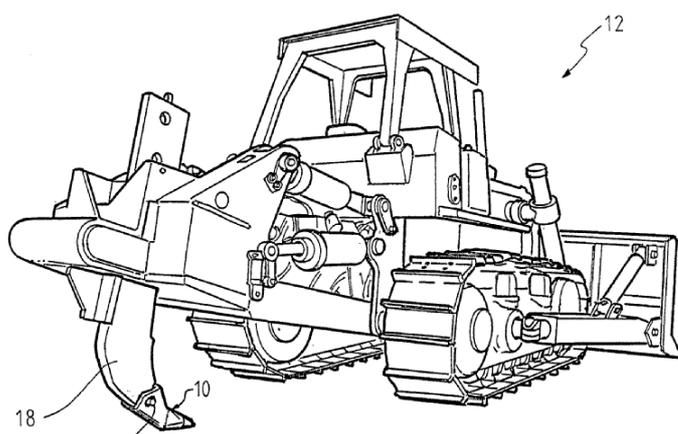


EP0259472



FR2789414

Rippers ([E02F 5/32](#))



WO2007022579

Informative references

Attention is drawn to the following places, which may be of interest for search:

Embankments	E02D
Laying pipes, making pipes in situ	F16L
Laying electric cables	H02G 1/06

Special rules of classification within this group

[E02F 5/22](#)

for machines specialised in making embankments:

- if the machine alone is described, the document is to be classified only in [E02F 5/22](#).

- if the embankment itself is defined, the document is also to be classified in [E02D](#).

[E02F 5/10](#), [E02F 5/101](#)

The documents concerning laying pipes, respectively laying electric cables are to be classified in [F16L](#), respectively in [H02G](#) too. But the documents for laying drainage devices are only to be classified in [E02F 5/10](#) or [E02F 5/101](#) and not in [E02B 11/02](#).

E02F 7/00

Equipment for conveying or separating excavated material (barges adapted for carrying-away material from floating dredgers [B63B 35/28](#))

Definition statement

This subclass/group covers:

- - conveying equipment, such as pipelines, conveyer belts or conveyer screws, etc, and delivery chutes or screening plants such as sieves, mixing machines, etc directly linked with excavation or dredging or soil-shifting machines.
- - loading devices such as hoppers mounted on dredgers or excavators.

Informative references

Attention is drawn to the following places, which may be of interest for search:

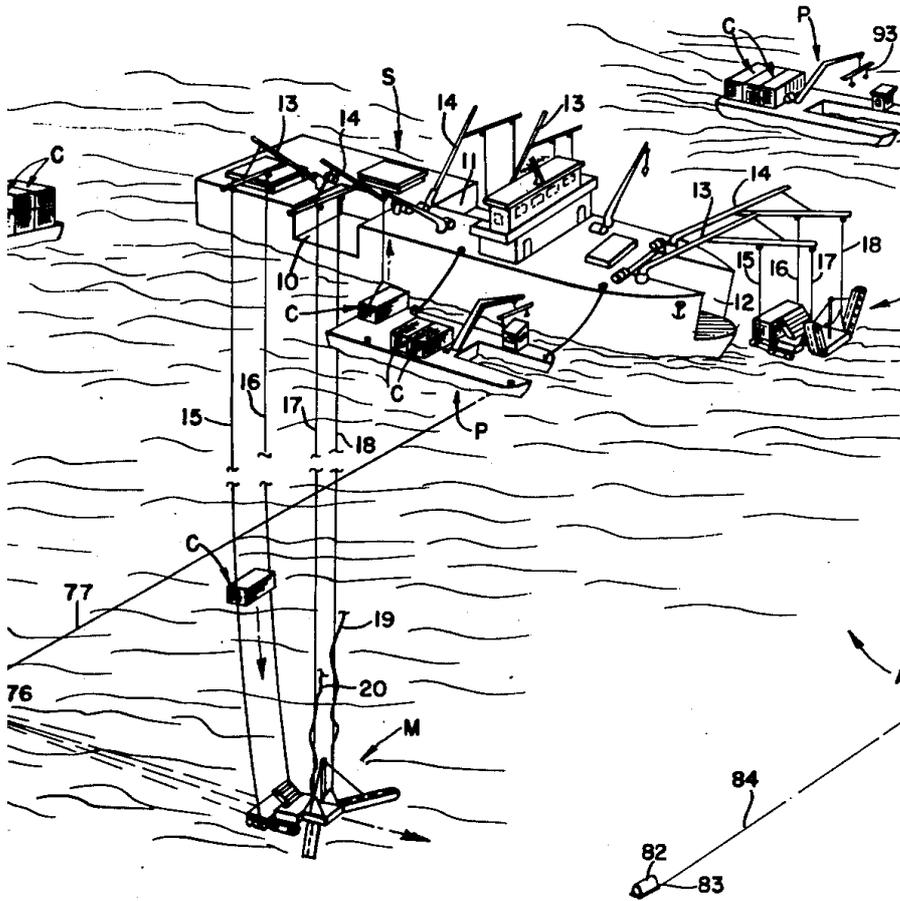
Separating solid from solid materials by sieving, screening	B07B
Conveyers, delivery chutes	B65G
Pipes in general	F16L

E02F 7/005

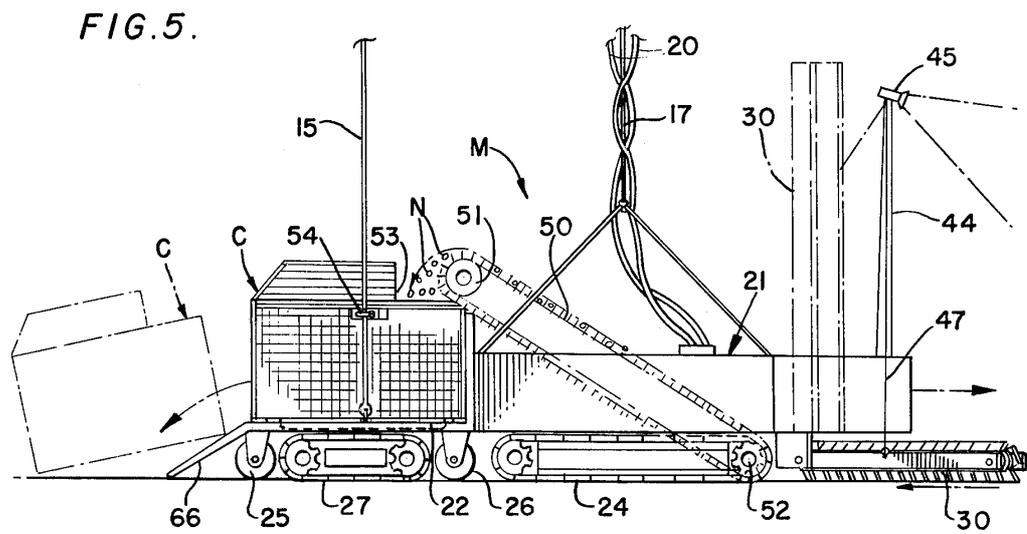
[N: conveying material from the underwater bottom (by pipelines [E02F 7/10](#); suction dredgers [E02F 3/88](#))]

Definition statement

This subclass/group covers:



with a closer view of M below



US4010560

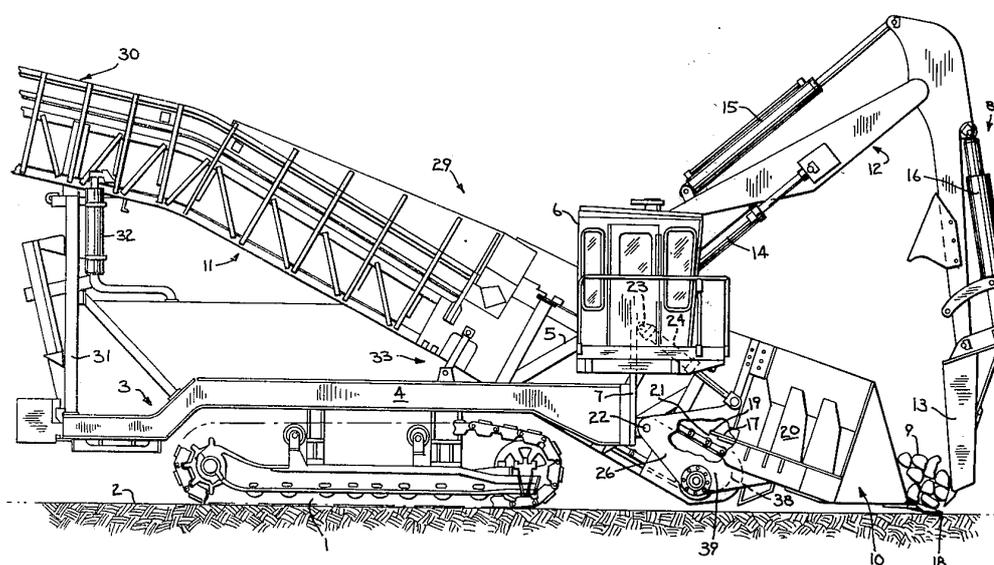
(often in combination with other classes, like subclasses of [E02F 3/88](#) or here in combination with subclasses of [E02F 3/08](#): "with digging elements on an endless chain")

E02F 7/026

[N: mounted on machines equipped with dipper- or bucket-arms]

Definition statement

This subclass/group covers:



US4196800

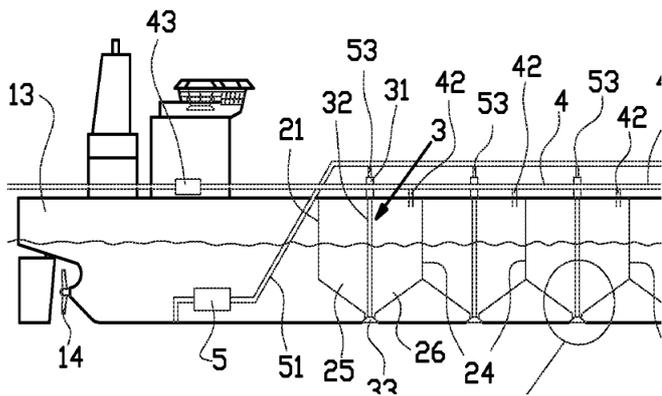
conveyor assembly 11 with front and rear sections 29 and 30 mounted on a machine equipped with a dipper arm structure 12

E02F 7/04

Loading devices mounted on a dredger or an excavator (loading devices in general [B65G](#)) [N: hopper dredgers, also equipment for unloading hopper]

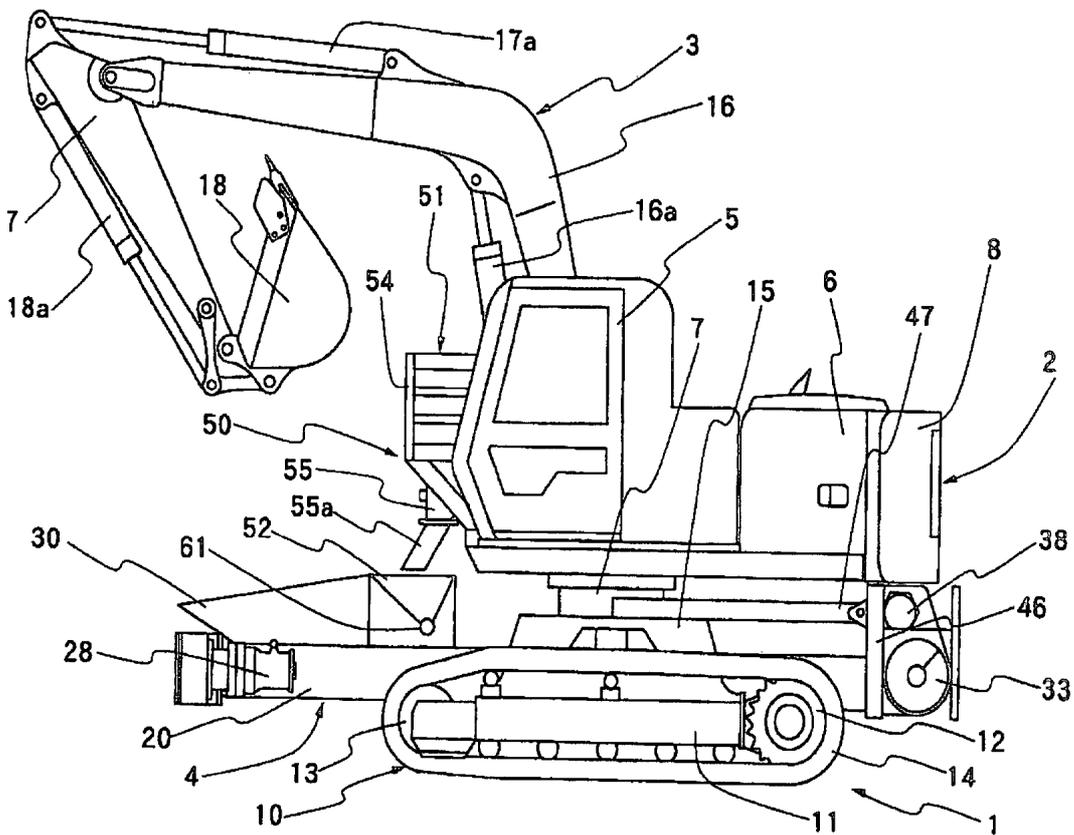
Definition statement

This subclass/group covers:



NL2005268C

Hopper dredger



US6171030

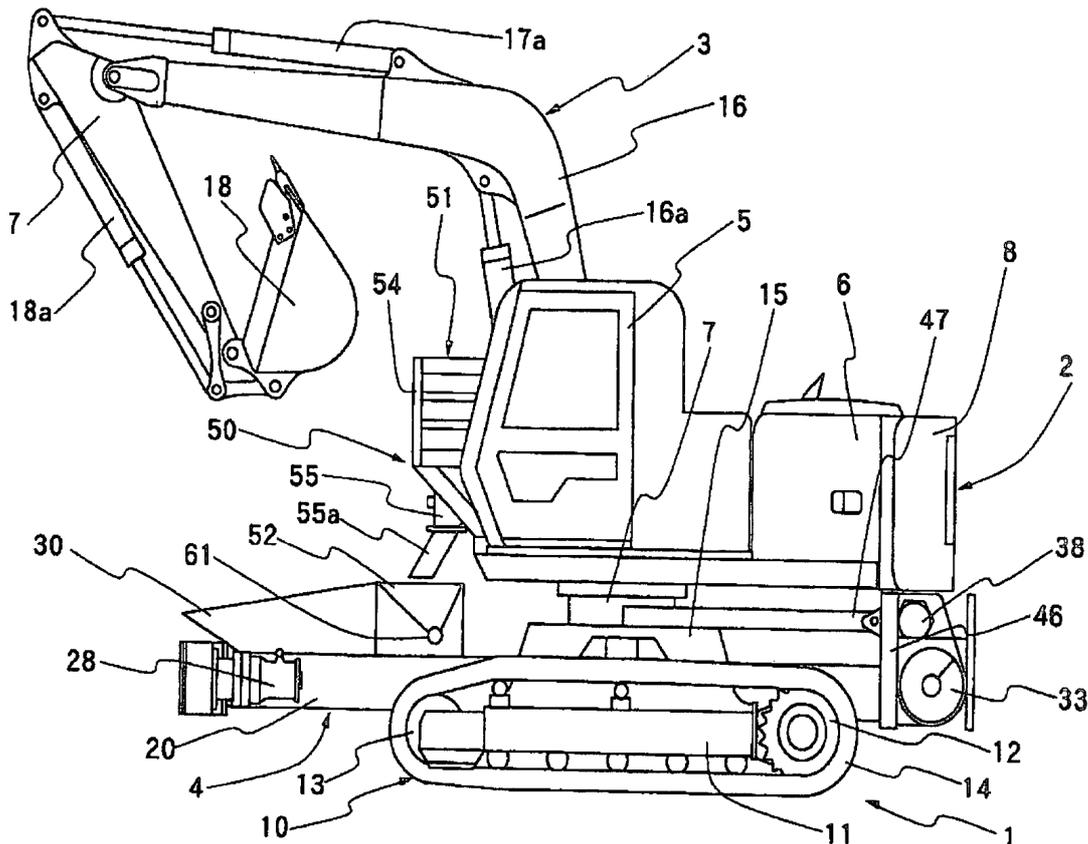
the soil hopper 30 is a loading device for the excavated soil (note: the document is also classified in [E02F 7/026](#), as 33 is a conveying discharging soil means and in [E02F 7/06](#) as 20 is a processing trough)

E02F 7/06

Delivery chutes or screening plants [N: or mixing plants] mounted on dredgers or excavators ([N: for back-filling [E02F 5/226](#) takes precedence]; separating equipment in general [B03](#); delivery chutes in general [B65G](#))

Definition statement

This subclass/group covers:



US6171030

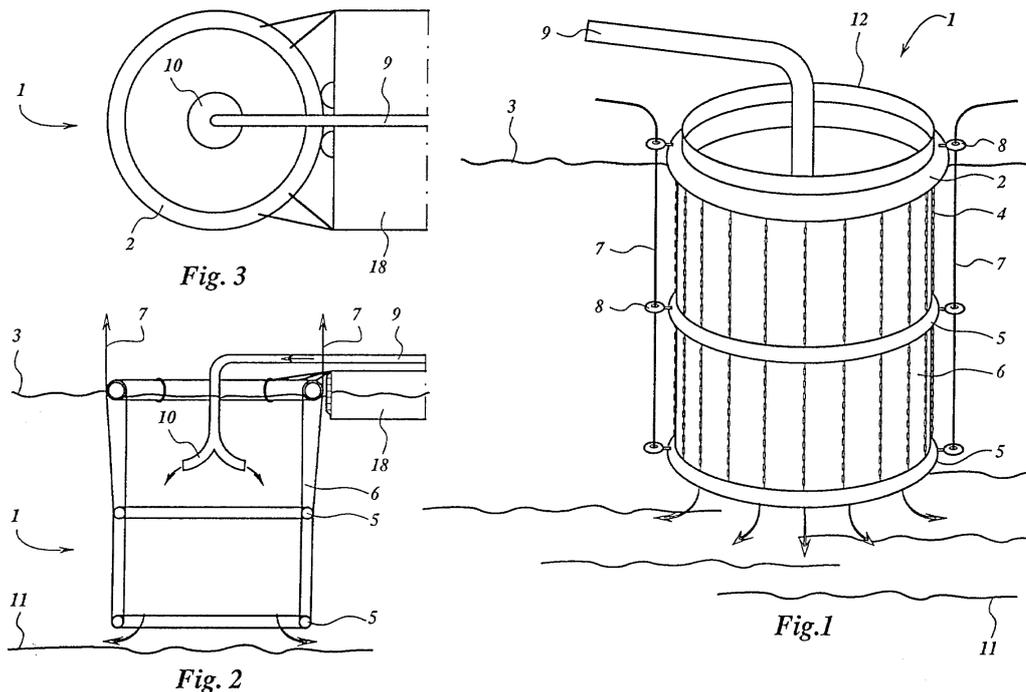
the processing trough 20 mixes excavated soil - from hopper 30 - and an additive - from hopper 50 (note: the document is also classified in [E02F 7/026](#), as 33 is a conveying discharging soil means and in [E02F 7/04](#) as 30 is a hopper for loading excavated soil)

E02F 7/10

Pipelines for conveying excavated materials (pipes in general [F16L](#); pipe-lines systems [F17D](#)) [N: conveying by liquid pressure [B65G 53/30](#)]

Definition statement

This subclass/group covers:



WO9844207

conveyor pipeline for dumping dredged materials (note: the document is also classified in [E02F 7/023](#) conveying equipment mounted on a floating dredger)

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](#))

Definition statement

This subclass/group covers:

More particularly the devices for transporting the machines, and the following elements mounted on dredgers and soil-shifting machines not otherwise provided for in [E02F 3/00](#), [E02F 5/00](#) and [E02F 7/00](#) and subgroups:

- pivot joint assemblies
- travelling-gear or undercarriages, for caterpillars for instance
- floating substructures
- superstructures and their supports

- slewing or traversing gears, such as turntables
- cabins
- counterweights
- drives, control systems of particular purposes, electric or hydraulic or pneumatic control devices not covered by other groups in [E02F](#)
- safety devices not covered by other groups in [E02F](#)
- indicating devices, like displays
- small wearing parts, like teeth or tips.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Travelling gears, caterpillars, undercarriages	B60B , B61F , B62D
Suspensions in vehicles	B60G
Control of several sub-units in vehicles	B60K , B60W
Engine control	F02D
Control of hydraulic pumps	F04B
Hydraulic systems	F15B
Pivots, bearings	F16C
Gearings	F16H

Special rules of classification within this group

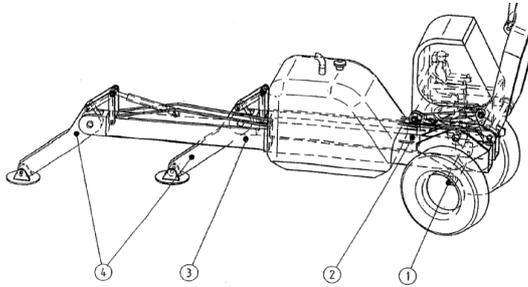
[E02F 9/022](#)



[E02F 9/028](#)

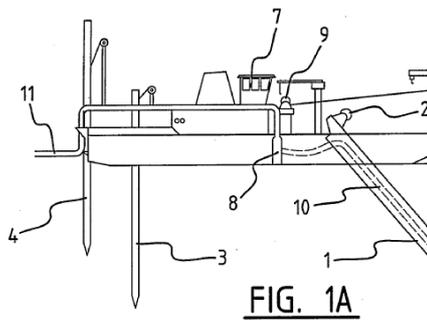


[E02F 9/04](#)



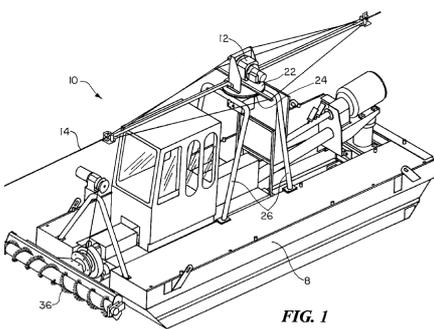
WO2004098985 (walking gears 4)

Spuds ([E02F 9/062](#))



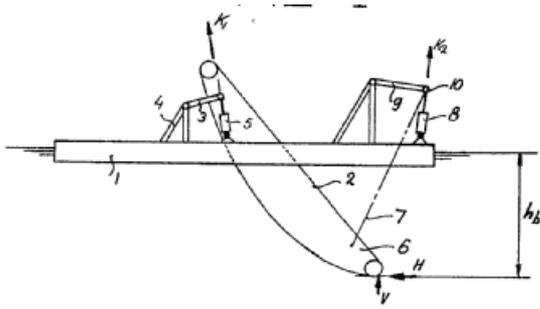
WO2006130934 (spuds 3 and 4)

[E02F 9/065](#)



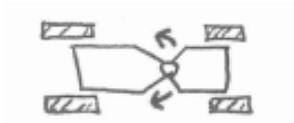
US6041527

[E02F 9/067](#) (to compensate the influence of the waves)

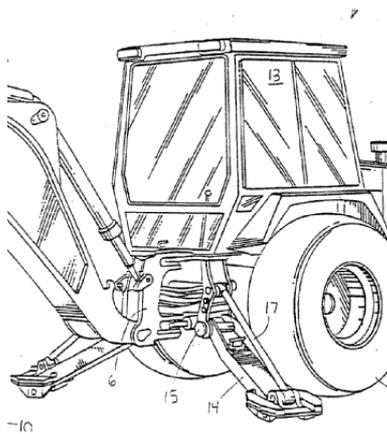


GB1521185

[E02F 9/0841](#)



[E02F 9/085](#)



EP1384825 (ground supports 14)

[E02F 9/12](#)



(traversing gear)

[E02F 9/121](#)



All inventions disclosing hydraulic circuits have to be classified in one of the

classes [E02F 9/2203](#) to [E02F 9/226](#) and in the appropriate subgroups of [E02F 9/2278](#).

All inventions disclosing hydraulic circuits with one or more accumulators have to be classified in [E02F 9/2217](#).

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Slewing or revolving or swing structure	Part of the vehicle frame which rotate about a vertical axis
FOPS	Falling Object Protection Structure
ROPS	Roll Over Protection Structure