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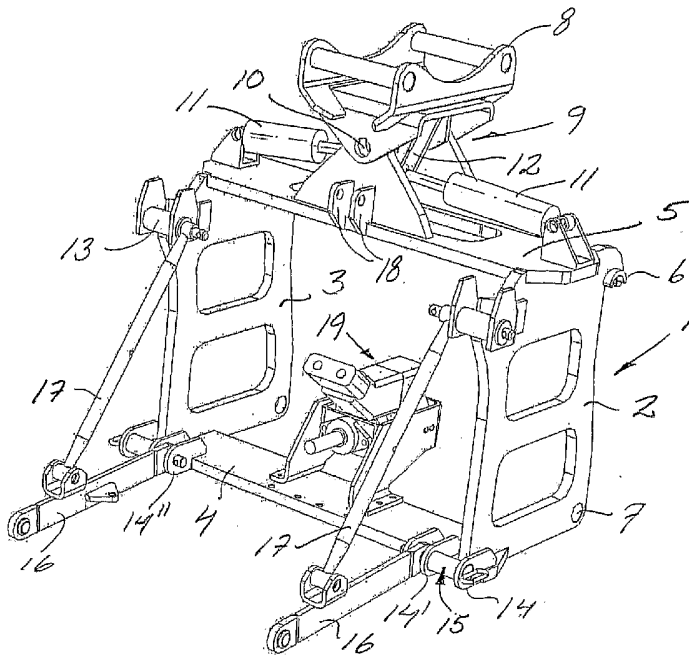
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TOOL HOLDER



(57) Abstract: The invention relates to a tool holder arranged, on one hand, to be coupled to a working vehicle and, on the other hand, to be coupled to a tool, comprising vehicle-coupling members for alternative coupling to different working vehicles as well as tool-coupling members for alternative coupling to different types of working tools. The tool holder is particularly characterized by a driving member carried on the tool holder and intended to drive a coupled tool.

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Tool holder

TECHNICAL FIELD

The invention relates to a tool holder arranged, on one hand, to be coupled to a working vehicle and, on the other hand, to be coupled to a tool. In particular, the invention relates to such a tool holder comprising vehicle-coupling members for alternative coupling to different working vehicles as well as tool-coupling members for alternative coupling to different types of tools.

TECHNICAL BACKGROUND OF THE INVENTION

Within the building and construction, agriculture and forestry, nature conservation and other fields of activity, there is a need for, by means of one and the same working vehicle, utilizing and driving different types of tools for the execution of varying types of jobs. Examples of such exchangeable tools are snow ploughs, snowblowers, sweeping rollers, concrete mixers, ploughs, harrows, water pumps, compressors, mowers, forestry processors, etc. In many cases, these are designed to be coupled to the three-point attachment that is arranged in the rear of a tractor, or to the front or back loader of the working vehicle. Many of the listed tools are furthermore driven by means of the tractor power take-off in connection with the three-point attachment, and therefore, in these cases the front loader cannot be utilized for the coupling of said tools.

During, for instance, grass mowing or other job on uneven or sloping ground, in ditches or in other hardly accessible locations and in shielded spaces, the capacity of a towed or pushed tool is limited to the possibility of driving the working vehicle across the location. In these cases in particular there is a demand to be able to couple the tool to an excavator arm, or to be able to alternate between a front or rear coupling position of the working vehicle.

THE INVENTION IN BRIEF

The invention aims at meeting the demand for greater flexibility to utilize different tools in a plurality of mounting positions and in connection with different types of working vehicles.

This object is attained by a tool holder arranged, on one hand, to be coupled to a working vehicle and, on the other hand, to be coupled to a tool, comprising at least a first and a second tool-coupling member arranged for alternative coupling of different tools to the tool holder. The tool holder is characterized by comprising vehicle-coupling member arranged for the coupling of the tool holder in alternative positions of a working vehicle or to different working vehicles, as well as by a driving member carried on the tool holder and having an output drive shaft to drive a coupled tool.

By these measures, a tool holder is provided in which a first vehicle-coupling member may be arranged for the coupling to a front loader mounted at the front part of a working vehicle, and in which a second vehicle-coupling member is arranged for the coupling to an arm for excavation mounted at the rear part of the working vehicle.

The first tool holder is preferably formed as a front-loader holder, and the second tool holder as a three-point attachment.

The driving member may be an electrically, hydraulically or pneumatically supplied motor, and may advantageously be an electrically supplied servomotor.

Furthermore, in one embodiment, the tool holder may have a tool-coupling member comprising a pin having a first axial portion of a first diameter formed in order to form a component included in a front-loader holder, and having a second axial portion of a second and smaller diameter formed in order to mount an arm included in a three-point attachment.

A tool holder according to the invention comprises advantageously a tool-coupling member that has three fastening ears arranged with mutually aligned holes, the holes of a first and a second fastening ear of which have a common diameter corresponding to the diameter of the first axial portion of said pin, and the hole of the third fastening ear has a smaller diameter corresponding to the diameter of the second axial portion of the pin.

BRIEF DESCRIPTION OF DRAWINGS

The invention is described closer below in connection with appended schematic drawings, in which

Fig. 1 shows a working vehicle having tool holders according to the invention coupled in a front lifting arm as well as in an excavating arm carried at the rear part of the vehicle;

Fig. 2 shows the tool holder in a perspective view, and

Fig. 3 shows an alternatively arranged tool holder in a perspective view corresponding to Fig. 2.

DETAILED DESCRIPTION OF THE INVENTION

The tool holder according to the invention comprises a supporting frame having a vehicle side and a tool side. On the vehicle side, at least one coupling member is arranged for the detachable mounting of the tool holder on a working vehicle, such as a tractor equipped with a front loader, three-point attachment or excavating arm, or alternatively an excavator. On the tool side, at least one coupling member is likewise arranged for the detachable mounting of a tool on the tool holder. This coupling member is suitably a three-point attachment, a front-loader holder, or other holder for the detachable coupling of a tool. Preferably, both the vehicle side and the tool side comprise at least two coupling members for alternative utilization of different tools and of different working vehicles.

In the embodiment shown in Figs. 1–3, the tool holder has a box-like support frame 1 having a pair of opposite vertical side pieces 2 and 3, respectively, which in the lower ends thereof are connected by a horizontal bottom piece 4 and in the upper ends thereof by a horizontal top piece 5. Here, the side pieces, bottom and top pieces of the support frame are shown as plates of steel, which are welded together in the corners of the support frame. The support frame is formed to carry the coupling member described below and may be given another constructive design than the one shown, such as a framework construction or girder construction, without the general idea of the invention therefore being abandoned.

In a side of the support frame 1 coupleable to a working vehicle, a first vehicle-coupling member is arranged in the form of a pair of hooks 6 (only one of which is visible in the drawing figure) and pin lead-throughs 7 for the coupling of the tool holder to co-operating members on the lifting arm of a front loader. A second vehicle-coupling member in the form of a biaxial holder, a so-called gate or a gate holder 8, is arranged on the top side of the top piece for the coupling of the tool holder to the excavating arm of an excavator loader or an excavator. Alternatively, the holder 8 may be arranged directly on the top piece 5 or indirectly by an intermediately coupled swivel joint 9, by means of which the support frame 1 can be tilted in an optional direction around the trunnion 10 of the joint. The tilting position is advantageously dynamically adjustable by means of at least one hydraulic cylinder 11, which engages between the support frame, or the top piece 5 thereof, and a holder 12 belonging to the tiltable part carrying the gate holder 8. In an alternative embodiment, instead of the hydraulic cylinder(s) 11, one or two stays 11' of adjustable length may be arranged between the support frame and the holder 12 for a static adjustment of a tilting position.

In a side of the support frame 1 coupleable to a tool, a first tool-coupling member is arranged in the form of a front-loader holder and comprising a pair of pins 13 as well as a pair of ears 14, 14' having through pins 15. A second tool-coupling member in the form of a three-point attachment comprising arms 16, which in the inner ends thereof formed with ears are articulately carried on the pins 15, and which in a conventional way are anchored in the support frame, for instance in the side pieces of the support frame by means of stays, such as the illustrated extensible stays 17. Also a pair of ears 18, arranged at the front edge of the top piece 5 of the tool holder for the lead-through of a pin (the pin is not shown), belongs to the three-point attachment.

Well protected inside the support frame 1, a driving member 19 is arranged to drive a tool that is coupled to one of the tool-coupling members. Advantageously, the driving member 19 is a hydraulic motor driven by the hydraulic system of the working vehicle, which motor has an output drive shaft 20 to drive, for instance, snowblowers, grass mowers or other working tools, carried in any of the tool-coupling members. The driving member may, alternatively, have another supply,

such as pneumatic or electrical, and may, for instance, be an electrically supplied servomotor.

Now, with reference to Fig. 3, a pin 15 included in the tool holder is shown. The pin 15 has a head, from which a first axial portion 15' extends that has a first diameter formed in order to form a component included in a front-loader holder. From said first axial portion of the pin 15, a second axial portion 15'' further extends that has a second and smaller diameter formed for the mounting of an arm 16 included in a three-point attachment. For the receipt of the pin 15, the support frame 1 has three fastening ears 14, 14' and 14'' having mutually aligned holes. The holes in a first and second fastening ear 14, 14' has a common diameter corresponding to the diameter of the first axial portion 15' of the pin 15, and the third fastening ear 14'' has a smaller diameter corresponding to the diameter of the second axial portion 15'' of the pin 15.

By the design thereof, the tool holder according to the invention provides an increased utilization of working vehicles and tools, and allows unlimited freedom of choice to couple any tool either to the front or the rear of the working vehicle, notwithstanding whether the vehicle is equipped with a loader or an excavating arm. Likewise, the tool holder according to the invention allows simultaneous utilization of different or co-operating tools coupled both to the front and to the rear of the vehicle, such as is illustrated in Fig. 1. In this way, not only the flexibility of the fleet of vehicles is increased, but also the working capacity by the fact that, for instance, double grass mowers or snowblowers can be operated simultaneously using one and the same vehicle, the working width of which in this way can be doubled during one and the same working operation.

CLAIMS

1. Tool holder arranged, on one hand, to be coupled to a working vehicle and, on the other hand, to be coupled to a tool, comprising at least a first and a second tool-coupling member arranged for alternative coupling of different tools to the tool holder, characterized by vehicle-coupling members operative for coupling of the tool holder in alternative positions of a working vehicle or to different working vehicles, as well as by a driving member (19) carried on the tool holder and having an output drive shaft (20) to drive a coupled tool.
2. Tool holder according to claim 1, characterized by a first vehicle-coupling member (6, 7) for the coupling to a front loader mounted in the front of a working vehicle, as well as a second vehicle-coupling member (8) for the coupling to an arm for excavation mounted in the rear of the working vehicle.
3. Tool holder according to claim 1 or 2, characterized by a first tool holder (13, 14, 14') formed as a front-loader holder, as well as a second tool holder (16, 18) formed as a three-point attachment.
4. Tool holder according to any one of the preceding claims, characterized in that the driving member (19) is an electrically, hydraulically or pneumatically supplied motor.
5. Tool holder according to claim 4, characterized in that the driving member is an electrically supplied servomotor.
6. Tool holder according to any one of the preceding claims, characterized by a tool-coupling member comprising a pin (15) having a first axial portion (15') of a first diameter formed in order to form a component included in a front-loader holder, and having a second axial portion (15'') of a second and smaller diameter formed in order to mount an arm (16) included in a three-point attachment.
7. Tool holder according to claim 6, characterized by a tool-coupling member comprising three fastening ears (14, 14', 14'') arranged with mutually aligned holes, the holes of a first and a second fastening ear (14, 14') of which have a common

diameter corresponding to the diameter of the first axial portion (15') of the pin (15), and the hole of the third fastening ear (14'') has a smaller diameter corresponding to the diameter of the second axial portion (15'') of the pin (15).

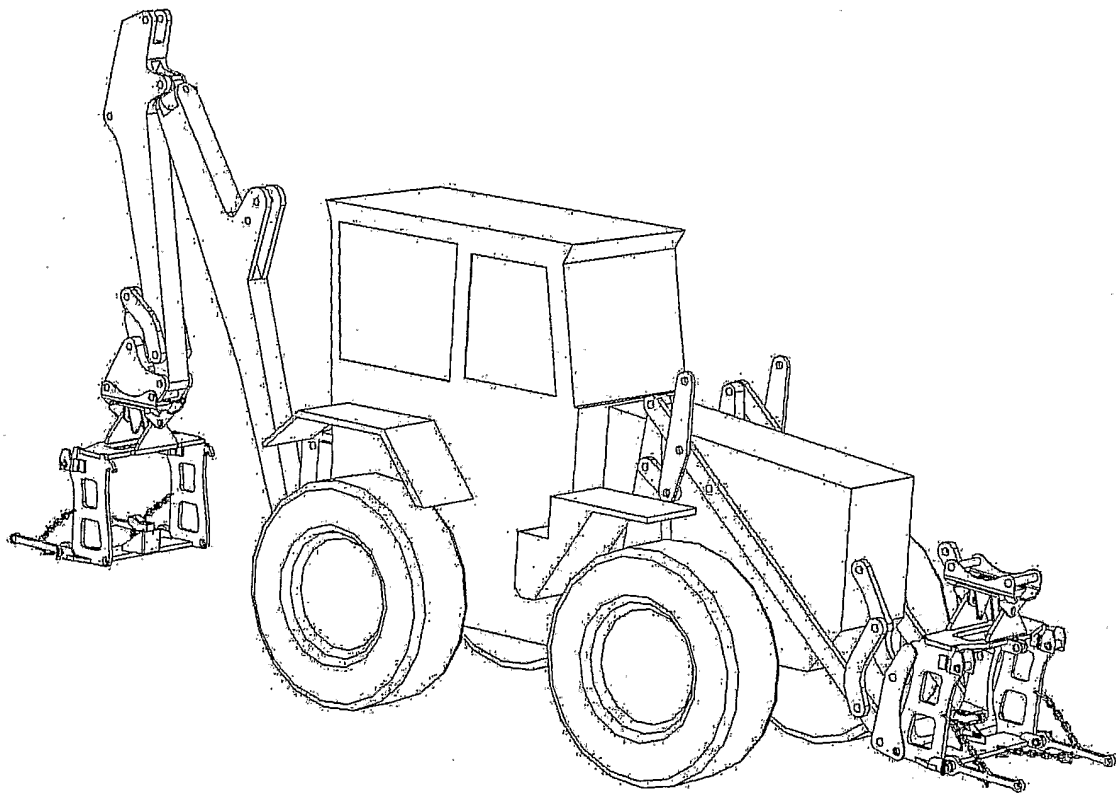
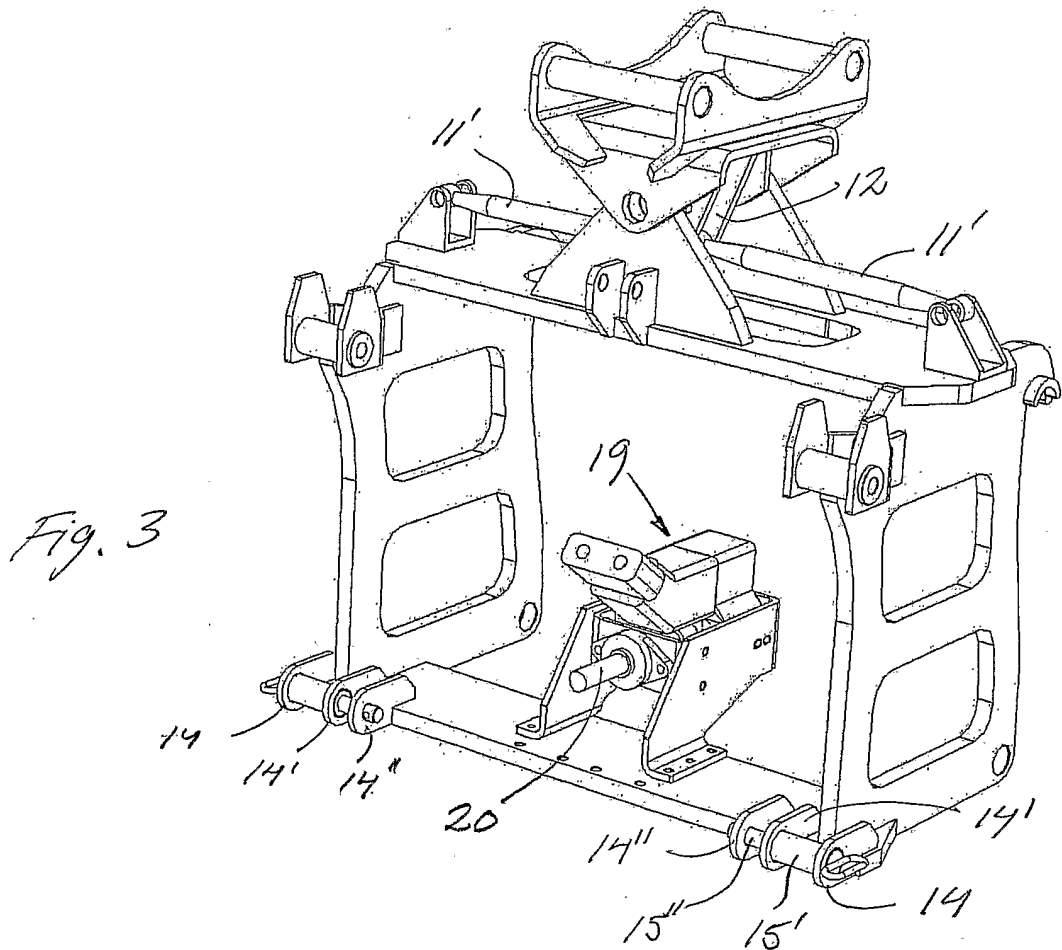
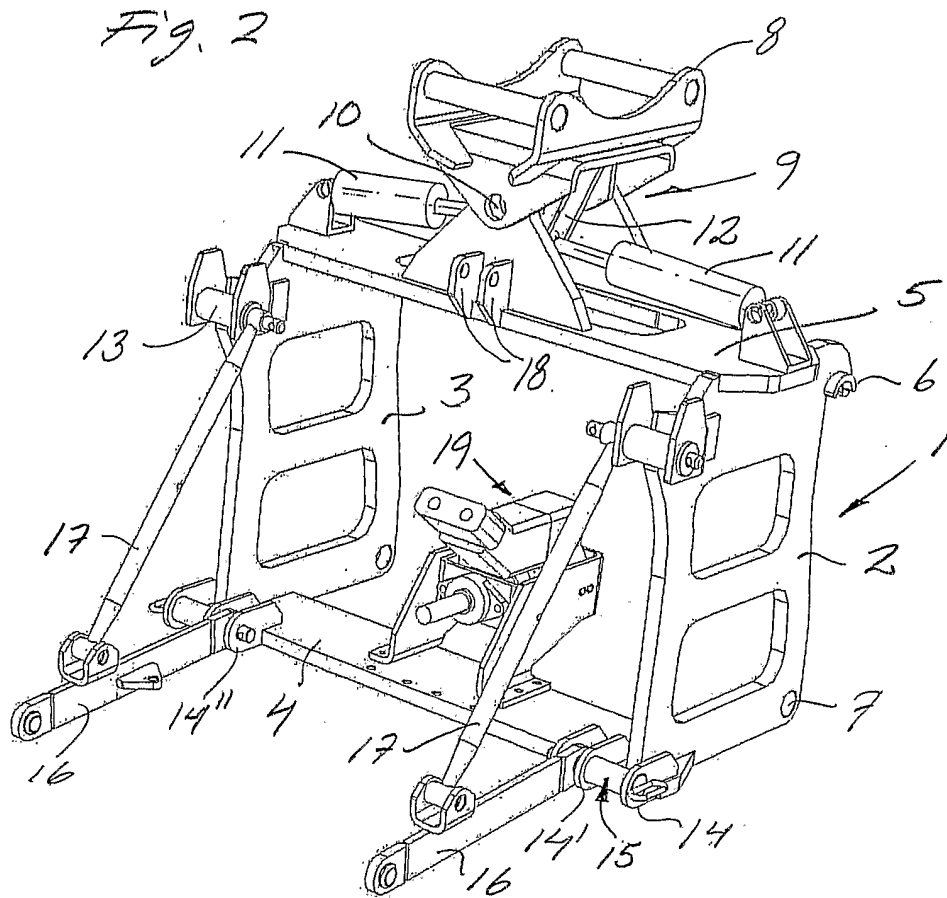


Fig. 1



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A01B, A01D, B66C, E02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6578295 B1 (MCPHERSON ET AL), 17 June 2003 (17.06.2003), abstract --	1
A	SE 399866 B (RENHOLMENS MEKANISKA VERKSTAD AB), 6 March 1978 (06.03.1978), page 1, line 1 - line 5 --	1,2,4
A	EP 1479830 A1 (SCHUSTER, BURKHARD), 24 November 2004 (24.11.2004), figures 1-4, abstract --	1,2
A	US 5657825 A (ENGLUND), 19 August 1997 (19.08.1997), figure 1, abstract -- -----	1,3

 Further documents are listed in the continuation of Box C. See patent family annex.

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Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE2005/002055

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