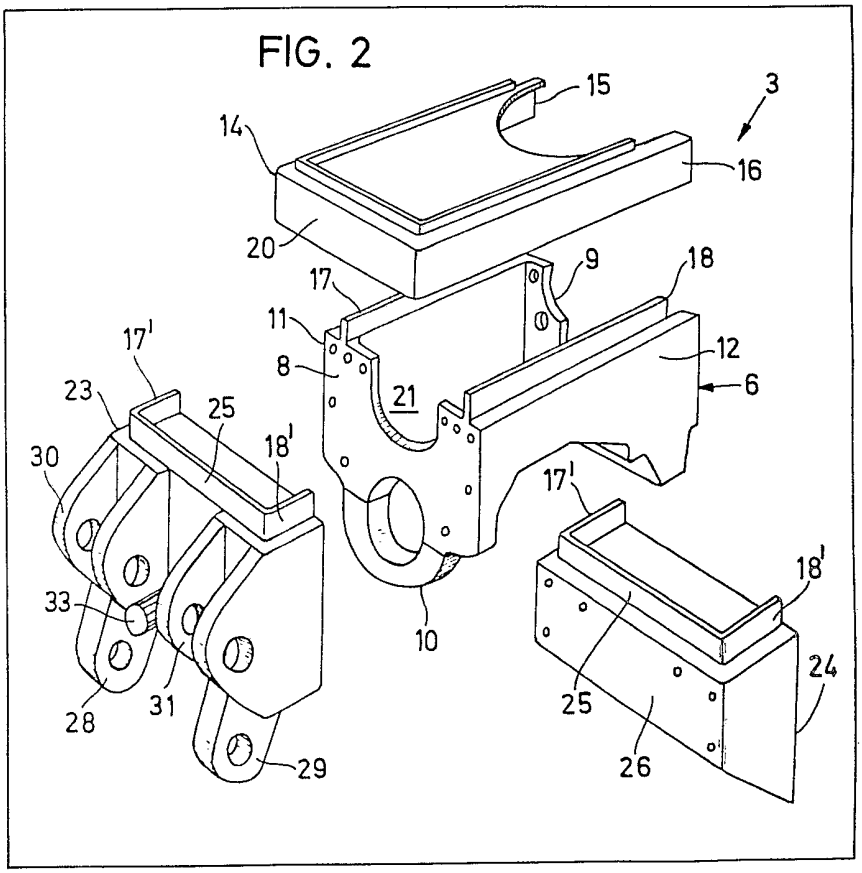
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(54) **A bearing block for supporting auxiliary equipment on a tractor**

(57) A bearing block (3) for a pivot-swing drive or driven front axle (2) of a tractor or similar motorized vehicle, the block being securable to the chassis or the internal combustion engine of the vehicle and serving as a support for auxiliary equipment which is or may be attached or fitted to the vehicle. The block always comprises a main member (6) which is a standard component for various versions of at least one of the vehicle maker's models; it supports the swing axle (2) - or, if the latter is a drive axle, the differential gear (4) therefor - and is adapted to receive at least one of a number of supplementary support members (14, 23, 24) fastenable to its front (8) or top, of which at least the front-fastenable ones (23, 24) are interchangeable. One of the latter (23) is provided with means (28, 29) for installing an implement-attaching device and a hydraulic working cylinder for lifting this device. The same member may also support a power take-off shaft (33). The other front-fastenable member (24) serves to carry a towing hook (5) Figure 1 and/or a bracket (41) Figure 7 for holding ballast weights while the top-fastenable member (14) may support the vehicle's battery and/or a frame carrying the engine casing and/or may enclose a hollow chamber for the storage of a fluid medium.

FIG. 2



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FIG. 1

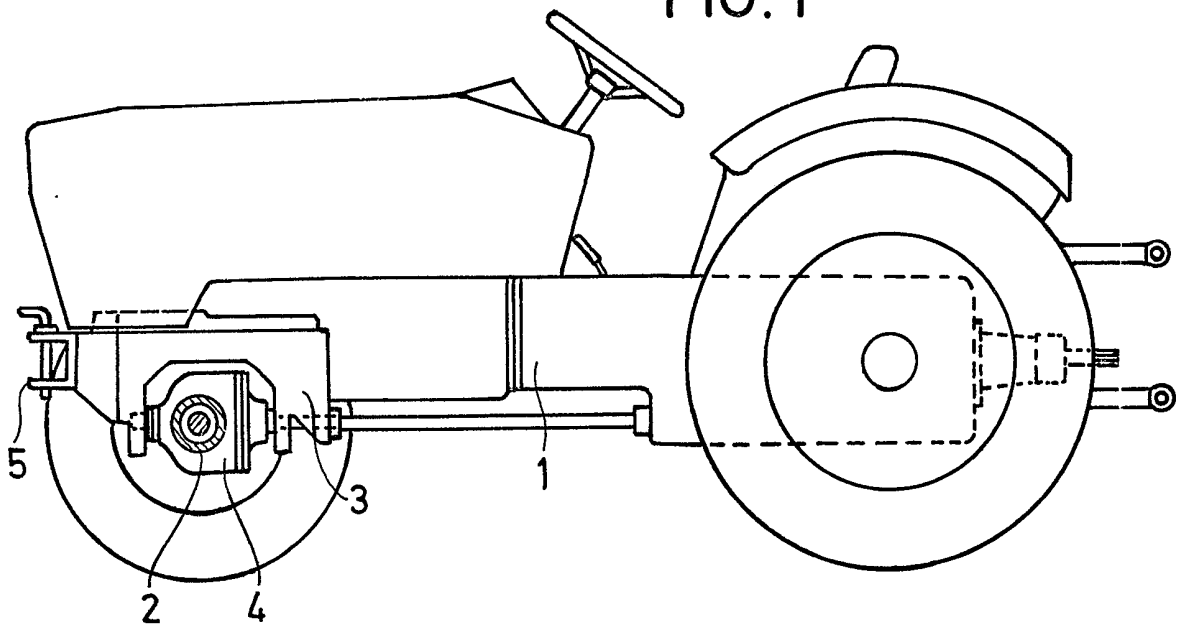

5
1
3
2
4

FIG. 2

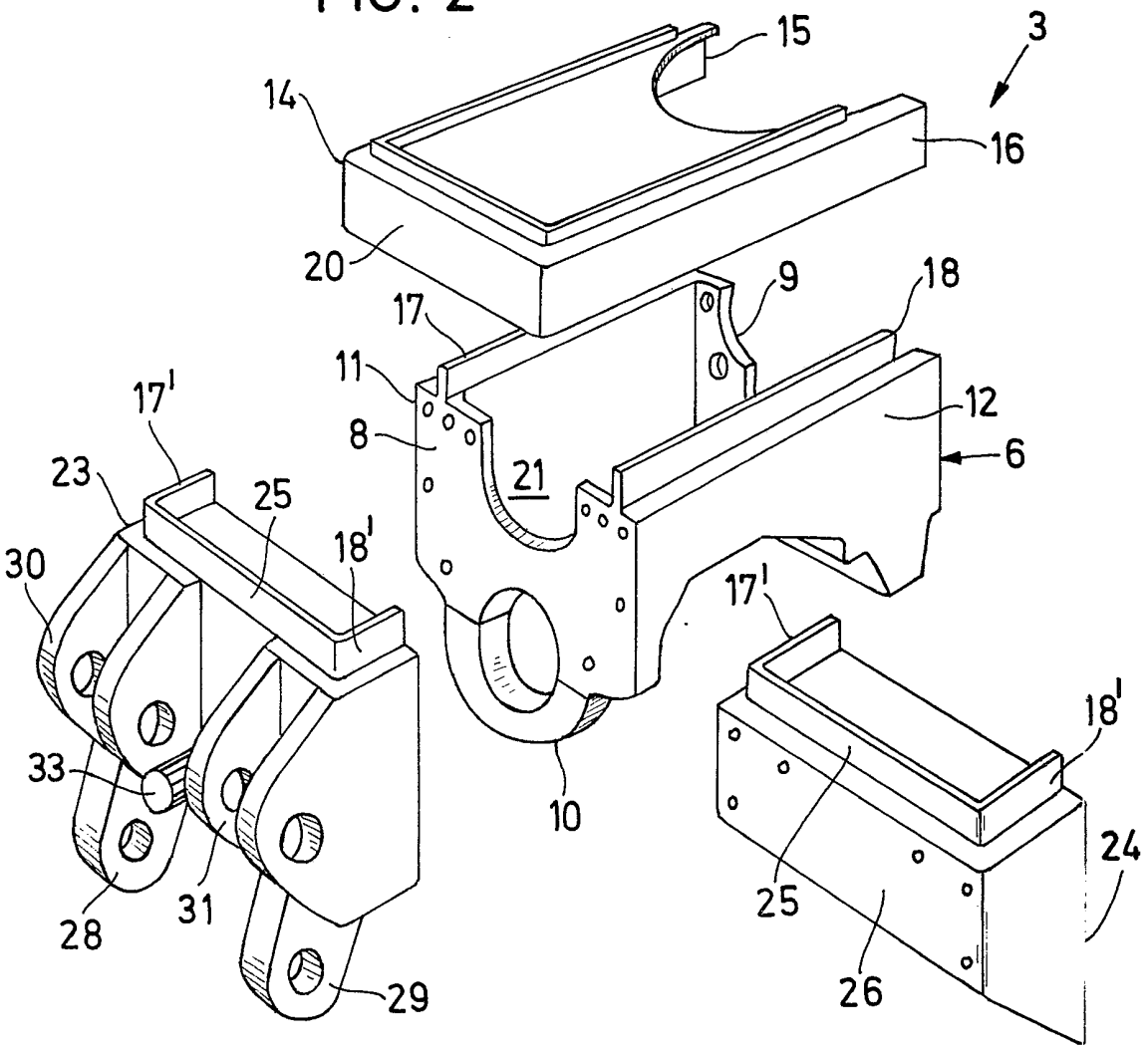

15
3
14
16
20
9
18
17
11
12
17'
8
6
21
23
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18'
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17'
18'
33
10
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28
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FIG. 3

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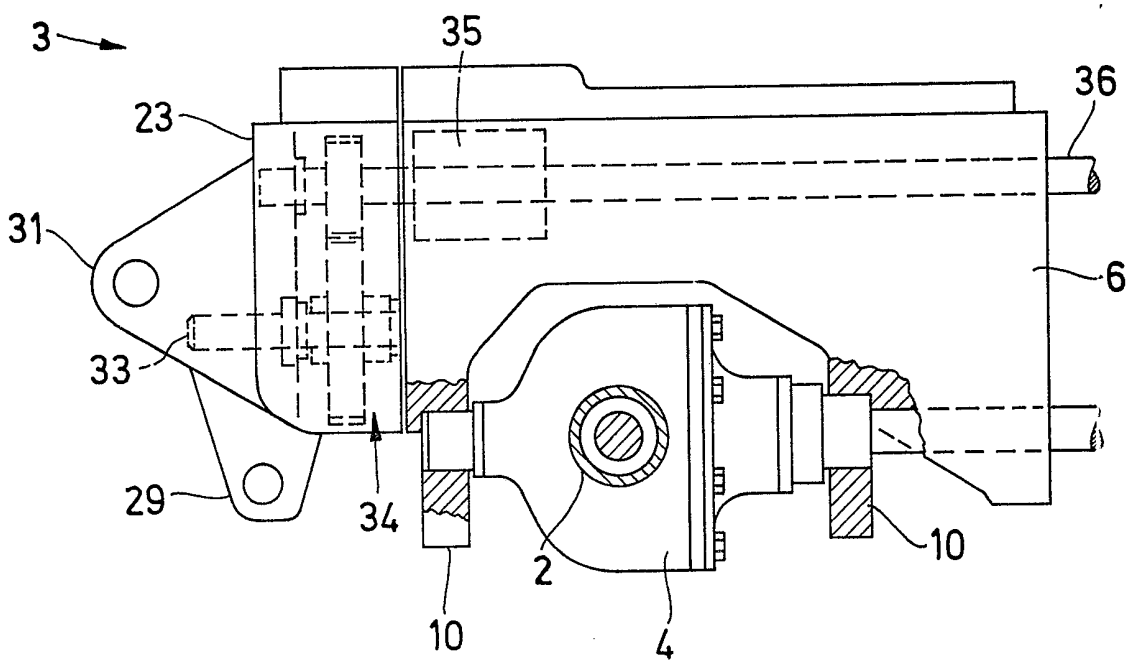
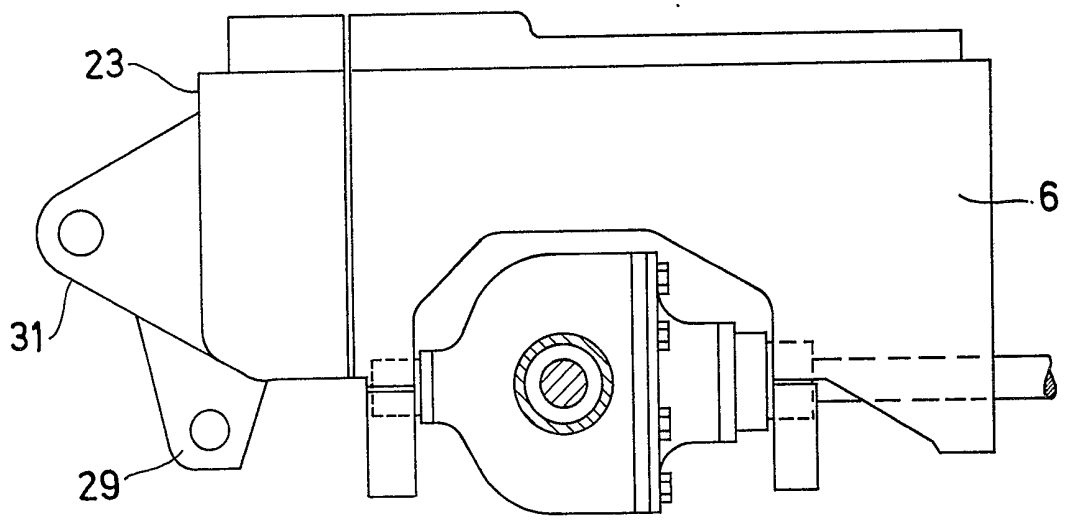


FIG. 4



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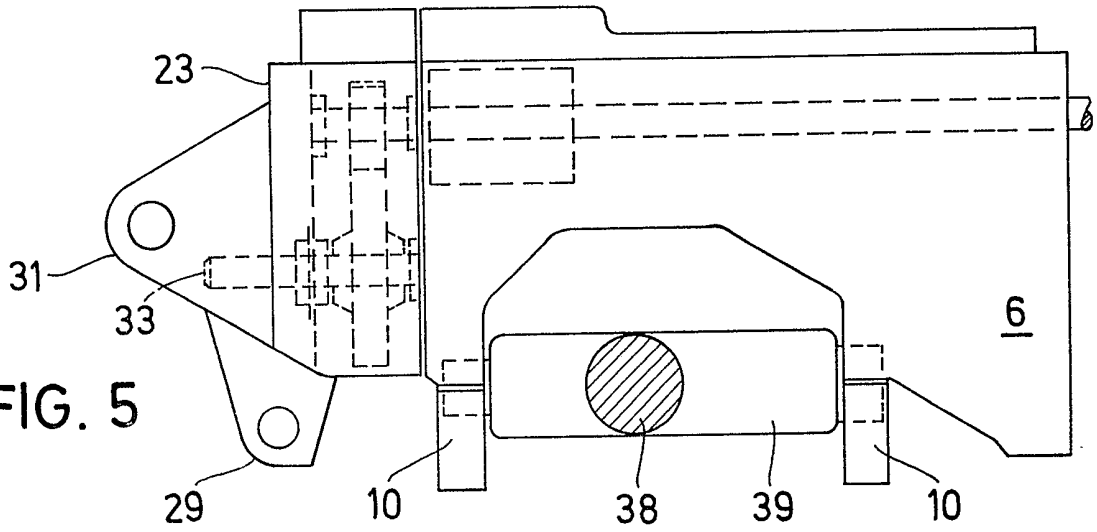


FIG. 5

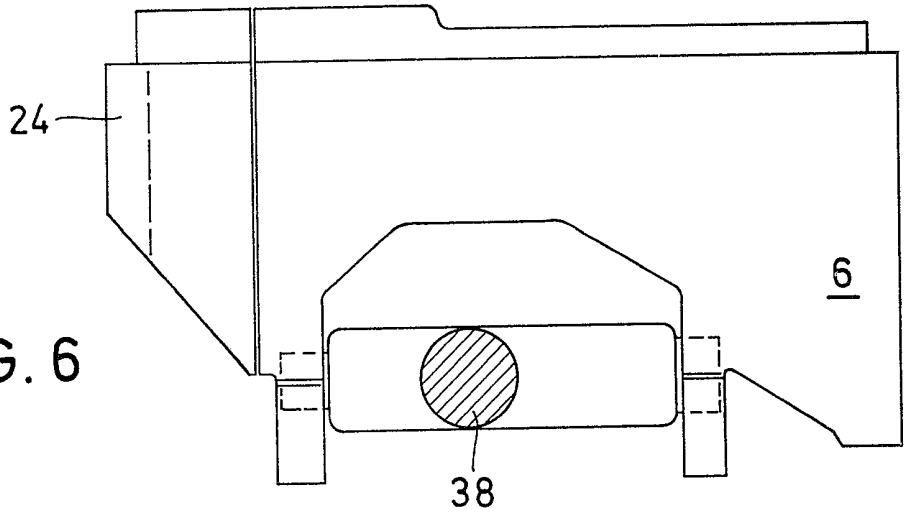


FIG. 6

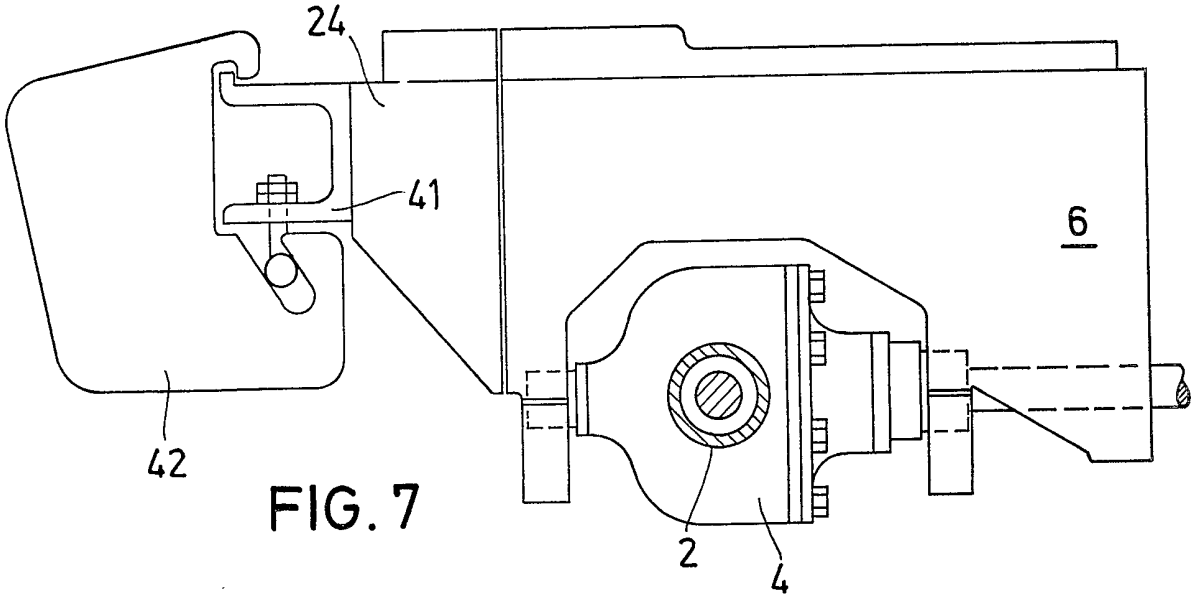


FIG. 7

SPECIFICATION

A bearing block for a pivot-swing front axle

This invention relates to a bearing block for a pivot-swing front axle of a tractor or a similar vehicle, the bearing block being securable to the chassis of the vehicle or, in the case of a monocoque vehicle body, to the internal combustion engine thereof, and capable of serving as a support for auxiliary equipment. Typical examples of such auxiliary equipment are parts of an implement-attaching device, a tow hook, one or more ballast weights, parts of the engine casing or a power take-off shaft, particularly elements used for transmitting rotary drive to the shaft.

Depending on the intended use, a tractor and similar vehicles used in the agricultural and/or construction industries are fitted with a conventional two-wheel or a four-wheel drive. In addition, tractors intended to be used for agricultural purposes are equipped, to an increasing extent, with a front power lift and also with a front power take-off shaft. However, the overwhelming majority of the farm tractors is not provided with the aforementioned equipment and is fitted only with a conventional two-wheel drive. Thus, the basic design of such a tractor does not usually permit the installation of a different kind of drive and of the other aforementioned equipment unless the bearing block for the front axle is re-designed in each instance, or if the design of the bearing block permits such an installation its construction is very expensive to enable it to accommodate a power lift and a power take-off shaft or, in the case of a four-wheel drive, the differential gear.

It is an aim of the invention to provide a bearing block for a pivot-swing front axle of a vehicle of the kind referred to which, while being of a design as simple and low-priced as possible, is of versatile use as far as the choice of the auxiliary equipment and the kind of drive to be fitted is concerned.

Accordingly, the invention provides a bearing block for a pivot-swing front axle of a tractor or a similar vehicle, the bearing block being securable to the chassis of the vehicle or, in the case of a monocoque vehicle body, to the internal combustion engine thereof and capable of serving as a support for auxiliary equipment, wherein the block always comprises as standard component for various versions of at least one model of such a vehicle a main member for supporting the swing axle, and wherein the main member is adapted to receive at least one of a number of supplementary support members fastenable to the main member and serving for attaching or installing the auxiliary equipment.

An outstanding advantage of a bearing block according to the invention is that its main member may be used for all versions of at least one tractor model, possibly even for a range of models produced by the same maker, and that, depending on the requirements in each instance, the supplementary support members need only to be secured thereto either by the maker prior to the sale of the tractor or by the user after purchase. Thus, a bearing block according to the invention, or at least its main member, can be used for the ordinary two-wheel drive tractor without any auxiliary equipment, and for a four-wheel drive tractor including auxiliary equipment if the supplementary members, at least two of which are inter-changeable, are fastened to the main member.

The main member is preferably of substantially oblong shape, conveniently rectangular in plan view, and securable to the vehicle with its longer sides extending substantially parallel with the vehicle's longitudinal axis. Advantageously, the main member is hollow and, depending on which of the auxiliary equipment the user chooses to attach or instal, one of the said two interchangeable supplementary members is alternatingly fastenable to its front and/or a third supplementary member is fastenable to the main member's top so as to increase its height. It is advantageous if the main member and all the supplementary members are of box-type construction.

In order to position the various members correctly to one another, either in the course of their original assembly or for the purpose of interchanging the front-fastenable members, it is advantageous if the main member and the front-fastenable members are each provided with two webs extending vertically from their respective tops, one along each of the main member's longer sides and those of each of the front-fastenable members' sides that when fastened to the main member are aligned with its longer sides. For the same reason, it is also advantageous if each of the front-fastenable members is provided at least along its side which in its fastened state forms the front of the bearing block with a further web also extending from the top thereof and being transverse to the two webs along its two aligned sides. The webs, assuming that they are provided, will engage the third supplementary member if such is fastened to the main member. It is useful if the third supplementary member is adapted to serve as a support for a front frame carrying the casing of the internal combustion engine and/or for the battery of the vehicle's electric system. However, the latter member may, alternatively or additionally, be constructed so as to enclose a hollow chamber for storing a fluid medium therein. Since at least one of the supplementary members, for example the third one for carrying the battery, is always likely to be required even in a two-wheel drive tractor without any auxiliary equipment, a bearing block according to the invention can be said to be a multi-member one.

Further, in order to assemble the pivot-swing front axle quickly, a split bearing for housing a pivot shaft of the axle, or its half-shafts, or a swivel bearing of a differential gear may be provided at the front and/or rear of the main member.

It is advantageous if one of the front-fastenable supplementary members is provided with bearing brackets for the direct or indirect pivotal mounting of the lower wishbones of an implement-attaching device and if one of these members, preferably the same one, is also provided with bearing brackets for pivotally mounting one or more -hydraulic-working

cylinders for lifting the implement-attaching device.

If a front power take-off shaft is provided, it may be supported by and its geared transmission be housed inside one of the box-type, front-fastenable supplementary members, preferably again the same member that is provided with the bearing brackets. It is preferable if a slide coupling for transmitting rotary drive through the geared transmission to the power take-off shaft is housed in the main member.

Another of the at least two front-fastenable supplementary support members may be adapted for securing thereto a towing hook and/or a bracket for fitting ballast weights thereon.

Further characteristics, features and advantages of the present invention may be more fully understood from the subsequent description of a number of embodiments of the invention illustrated in the accompanying drawings, in which:

Figure 1 is a side view, partly cut away, of a tractor having a pivot-swing front axle including a bearing block according to the invention;

Figure 2 is an exploded perspective view of the bearing block including a main member and preferred supplementary support members;

Figure 3 is a side view of a front axle's bearing block for a four-wheel drive tractor including a front power take-off shaft and brackets for an implement attaching device;

Figures 4 to *7* are side views of four more embodiments.

The tractor illustrated in Figure 1 comprises a monocoque vehicle body 1 provided with a bearing block 3 for supporting a pivot-swing front axle 2 which in the embodiment illustrated is a drive axle. A differential gear 4 for the pivot-swing axle 2 is pivotally supported in the bearing block 3 to the front of which a towing hook 5 is fixed. The block 3 comprises a main member and fastenable thereto - to suit individual and/or changing requirements - a number of supplementary support members as illustrated in more detail in Figure 2. The member of the bearing block denoted by the reference numeral 6 is the main member which is of box-type construction and of substantially rectangular shape in plan view. It is the indispensible component of a bearing block according to the invention but can be used by the tractor maker for substantially all versions of at least one of his tractor models and, possibly, of a number of his models. Towards this end, the main member 6, which is securable to the vehicle with its longer sides substantially parallel with the longitudinal axis thereof, is designed so as to be capable of accommodating not only a drive but also a driven swing-pivot axle. A split bearing 10 for receiving the two pivot shafts of a driven swing-pivot axle or, in the case of a swing-pivot drive axle, for accommodating the differential gear, is arranged in each the front wall 8 and the rear wall 9 of the main member 6. In the case of a monocoque vehicle body the rear wall 9 of the main member 6 will be fastened directly to the engine casing. If the vehicle body is built on a chassis, other possibilities of fastening present themselves, for example securing portions of the chassis to the two side walls 11 and 12 of the main member 6 or *vice versa*, or even securing the main member to the chassis so as to make it a part thereof. A supplementary support member 14 - hereinafter also referred to as "third" member - is provided for fastening to the top of the main member 6, which third member is also of box-type construction. Once the member 14 has been positioned during assembly on the main member 6 and fastened thereto - by means not illustrated - its two side walls 15 and 16 will overlap webs 17 and 18 respectively extending vertically from the top of the main member, one along each of its two longitudinal sides or walls. The third member 14 serves as a compensating element for the purpose of always facilitating the use of the same casing components for different versions of the same tractor model but having differently sized engines. The third member 14 may alternatively or additionally serve as a support for a front frame - not illustrated - for carrying the casing of the internal combustion engine. In addition, the third member may be provided with means for positioning and securing the vehicle battery or with an intermediate wall. Finally, it is alternatively or additionally possible to construct the third supplementary member 14 so as to enclose a hollow chamber for storing a fluid medium therein.

A recess 21 for the support and passage therethrough of the drive portion of a front power take-off shaft is provided in the front wall 8 of the main member 6.

Depending on which one is chosen, one of at least two supplementary members 23 or 24 may be bolted to the front wall 8 of the main member 6. Both supplementary members 23 and 24 are of box-type construction and are also provided on their respective tops with vertical webs 17' and 18' which at their front ends are connected by a further, transverse, web 25 and which, in the assembled condition of the member 23 or 24, form a continuation of the webs 17 and 18 of the main member 6. It is to be understood that, when the third member 14 has been mounted on the main member, the side walls 15 and 16 and the front wall 20 of the former also overlap the webs 17' and 18' and 25 of the supplementary member 23 or 24. The front wall 26 of the supplementary member 24 is constructed in such a way that, for example, the towing hook 5 according to Figure 1 and/or a bracket for attaching ballast weights thereon according to Figure 7 may be secured thereto. Differently therefrom, the supplementary member 23 is constructed for the installation of a front implement-attaching device and is provided, therefore, at its bottom with two bearing brackets 28 and 29 for pivotally mounting therein the lower wishbones - not illustrated - thereof. Two bearing brackets 30, 31 arranged above the brackets 28 and 29 serve for the pivotal mounting of two working cylinders for lifting and lowering the device. In addition, the support element 23 may be provided with a bearing bracket for the upper wishbones. Apart from the aforementioned auxiliary equipment the member 23 also supports a front power take-off shaft 33.

Figure 3 illustrates a bearing block according to the invention to the front of the main member 6 of

which the supplementary member 23 including means for the pivotal mounting of the front implement-attaching device and for the support of the front power take-off shaft 33 is fastened. A reduction gear 34 of the power take-off shaft 33 is housed in the member 23 while a slide coupling 35 for engaging and disengaging a drive shaft 36 with the reduction gear 34 is housed in the main member 6. The shaft 36 for driving the power take-off shaft 33 through the geared transmission 34 is directly connectable to the crank shaft - not illustrated - of the internal combustion engine. The bearing blocks according to Figures 3 to 7 are illustrated, for the sake of simplicity, without the third member 14 shown in Figure 2. The bearing block 3 illustrated in Figure 4 includes in addition to the main member 6 the front-fastenable member 23 for mounting the implement-attaching device. The power take-off shaft 33 is not provided in this embodiment of the invention.

The bearing block 3 illustrated in Figure 5 includes again in addition to the main member 6 the supplementary member 23; the front power take-off shaft 33 is also provided. This build-up of the block 3 corresponds to that shown in Figure 3, but differs from the latter by the provision of a driven steering axle 38 pivot shafts 39 of which are mounted, instead of the differential gear 4, in the bearings 10 of the main member 6.

The simple supplementary member 24 of the bearing block according to Figure 6 is fastened to the front of the main member 6. This embodiment, as that shown in Figure 5, merely includes a pivot-shaft mounting of the driven steering axle 38.

Finally, Figure 7 illustrates a bearing block according to the invention comprising the members 6 and 24 and in which a drive steering axle 2 is supported by means of the differential gear 4. A U-shaped bracket 41 for fitting disc-shaped ballast weights 42 thereon is secured to the front of the supplementary member 24. The bracket 41 may also be used as a towing hook provided the ballast weights 42 are suitably suspended on both sides of a towing stud - not illustrated - arranged in the middle of the bracket 41.

It is to be understood that the invention is not restricted to the embodiments illustrated; indeed, a series of other combination facilities are feasible. The essential feature is that the main member 6 is used in all instances regardless of what combination may be required and that the remaining members are fastened thereto to meet the requirements that arise. It is to be understood that the various supplementary members may be differently constructed if this is considered useful.

CLAIMS

1. A bearing block for a pivot-swing front axle of a tractor or a similar vehicle, the bearing block being securable to the chassis of the vehicle or, in the case of a monocoque vehicle body, to the internal combustion engine thereof and capable of serving as a support for auxiliary equipment, wherein the block always comprises as standard component for various versions of at least one model of such a vehicle a main member for supporting the swing axle, and wherein the main member is adapted to receive at least one of a number of supplementary support members fastenable to the main member and serving for attaching or installing the auxiliary equipment.

2. A bearing block according to claim 1, wherein the main member is of substantially oblong shape and securable to the vehicle with its longer sides located substantially parallel with the longitudinal axis thereof.

3. A bearing block according to claim 1 or claim 2, wherein the main member is hollow, and wherein one of at least two interchangeable supplementary members is fastenable to the front of the main member.

4. A bearing block according to any of the preceding claims, wherein a third supplementary member is fastenable to the top of the main member.

5. A bearing block according to any of the preceding claims, wherein all the support members are of box-type construction.

6. A bearing block according to claim 4 or claim 5, wherein the main member and the front-fastenable supplementary members are each provided with two webs extending vertically from their respective tops one along each of the main member's longer sides and those of each of the front-fastenable supplementary members' sides that when fastened to the main member are aligned with the longer sides thereof, wherein each of the front-fastenable members is provided at least along its side which in its fastened state forms the front of the bearing block with a further web also extending vertically from the top thereof and being transverse to the two webs along its two aligned sides, and wherein all the webs engage the third supplementary member if such is fastened to the main member.

7. A bearing block according to any of the claims 4 to 6, wherein the third supplementary member is adapted to serve as a support for a frame carrying the casing of the internal combustion engine and/or the battery of the vehicle's electric system.

8. A bearing block according to any of the claims 4 to 7, wherein the third supplementary member is constructed so as to enclose a hollow chamber for storing a fluid medium therein.

9. A bearing block according to any of the claims 2 to 8, wherein a split bearing for housing a pivot shaft of the front axle or a swivel bearing of a differential gear is provided at the front and/or the rear of the main member.

10. A bearing block according to any of the claims 3 to 9, wherein one of the front fastenable supplementary members is provided with bearing brackets for the direct or indirect pivotal mounting of the lower wishbones of an implement-attaching device.

11. A bearing block according to any of the claims 3 to 10, wherein one of the front-fastenable supplementary members is provided with bearing brackets for pivotally mounting one or more working cylinders for lifting and lowering the implement-

attaching device.

12. A bearing block according to any of the claims 3 to 11, wherein one of the front-fastenable supplementary members is adapted to support a power take-off shaft and to house the geared transmission thereof.

13. A bearing block according to claim 12, wherein the main member is adapted to house a slide coupling for transmitting rotary drive through the geared transmission to the power take-off shaft.

14. A bearing block according to any of the claims 3 to 13, wherein another of the at least two front-fastenable supplementary members is adapted for securing thereto a towing hook and/or a bracket, the bracket serving for holding ballast weights.

15. A bearing block for a pivot-swing front axle of a tractor or a similar vehicle, the bearing block being securable to the chassis of the vehicle or, in the case of a monocoque vehicle body, to the internal combustion engine thereof and capable of serving as a support for auxiliary equipment, constructed, arranged and adapted to operate substantially as herein described with reference to the accompanying illustrative drawings.

16. A motor vehicle of the kind used in the agricultural and/or construction industries, for example a tractor, having a pivot-swing front axle including a bearing block as claimed in any of the preceding claims.

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