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- (73) Patenthaver: **Fay, Pdraig Oliver, Cortober, Cootehill, Co. Cavan, Irland**
- (72) Opfinder: **Fay, Pdraig Oliver, Cortober, Cootehill, Co. Cavan, Irland**
- (74) Fuldmægtig i Danmark: **Plougmann Vingtoft A/S, Strandvejen 70, 2900 Hellerup, Danmark**
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None

DESCRIPTION

Introduction

[0001] This invention relates to a jack and more particularly to a jack for vehicles having powered lifting arms such as tractors, plant machinery and the like.

Background of the Invention

[0002] Large machinery such as tractors, earth moving equipment and the like (hereinafter referred to collectively as plant machinery) require regular raising off the ground to provide access to the components of the plant machinery for operations such as cleaning and general mechanical maintenance e.g. on the brakes of vehicles. In order to perform the raising operations, relatively sophisticated jacks such as manually operated hydraulic trolley jacks must be employed which are expensive and cumbersome to use. This is particularly a problem with tractors where farmers may not have access to trolley jacks.

[0003] Moreover, the safe use of trolley jacks generally requires two personnel to correctly position and raise a tractor employing a trolley jack. However, many farmers work alone and a second person is generally not available with the result that known trolley jacks are often used by farmers when alone with consequent safety risks.

[0004] US 2 548 695 A describes a jack for lifting a tractor in which the hydraulic lifting arms of the tractor are employed to lift the tractor on the jack. Similarly, US 2555 471 A describes a jack made up of a stand for engaging beneath a tractor. US 2 463 305 A also describes a tractor jack for lifting a tractor with its lifting arms and GB 2 335 909 A describes a tractor jack having levers for lifting a tractor with its lifting arms according to the preamble of claim 1. FR 2 963 598 A also describes a size adjustable jack operable via the lifting arms of a tractor.

Summary of the Invention

[0005] According to the invention there is provided a jack comprising:
a carriage having a front end and rear end for placing beneath a vehicle having a lifting arm, attachment means for attaching the carriage to the lifting arm wherein the attachment means is co-operable with the lifting arm to jack up the vehicle on the carriage as defined in claim 1.

[0006] Preferably, the attachment means comprises at least one upright support on the carriage. More preferably, the attachment means comprises a pair of spaced apart upright supports on the carriage. Most preferably, the pair of spaced apart upright supports is mounted on the front end of the carriage.

[0007] Advantageously, the carriage further comprises a support bearing between the front end and the rear end for supporting a vehicle. Preferably, the support bearing comprises a transverse shaft on the carriage. More preferably, the position of the shaft on the carriage is adjustable.

[0008] The carriage comprises a platform for holding a raised vehicle in a raised position. The platform comprises a pair of spaced apart legs. The legs are height adjustable.

[0009] Optionally, the legs are hydraulically powered.

[0010] Advantageously, the legs are pivotably mounted on the carriage.

[0011] Preferably, the jack further comprises an attachment arm releasably mountable between the jack and a vehicle. More preferably, the attachment arm comprises a pair of attachment arms mountable between the jack and the vehicle. Most preferably, the pair of attachment arms is mountable between the platform and the vehicle.

[0012] In a further embodiment of the invention, the jack comprises a shoulder for attaching the jack to a second vehicle. Preferably, the shoulder is mounted on the upright.

[0013] In a preferred embodiment of the invention, the jack comprises a tractor jack.

[0014] The invention therefore provides a jack having a carriage for placing beneath a vehicle having a lifting arm and attachment means for attaching the carriage to the lifting arm wherein the attachment means is co-operable with the lifting arm to jack up the vehicle.

[0015] The advantages of the invention are many. The jack is simple to use and exploits the hydraulic system and lifting arms of the tractor to raise and lower the tractor in a self-lifting manner with the aid of the jack. No external hydraulics or trolley jacks are required. Tractors can be supported on the jack with the tractor lifting arms or with attachment arms so that the lifting arms can be released and the tractor maintained in the raised position if desired. In addition, the jack can be easily and accurately positioned beneath tractors as required.

[0016] The jack of the invention can also be safely used by an individual if desired.

[0017] Moreover, the tractor can be moved with the jack of the invention in place with the rear wheels removed.

Brief Description of the Drawings

[0018] The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view from above and one side of a jack of the invention with the optional tractor attachment arms mounted on the legs of the jack for illustrative purposes with the direction of approach of a reversing tractor to the jack indicated by the arrow;

Figure 2 is a side elevation of the jack of Figure 1 with the tractor supported by the jack via the hydraulically powered tractor lifting arms and the rear wheels of the tractor being raised off the ground so that the tractor is supported on the jack wheelset with the legs of the jack in the raised non-operating position on the jack;

Figure 3 is a side elevation of the jack and tractor of Figure 2 with the legs of the jack in the lowered operating position and the tractor lifting arms raised further to hold the tractor in the raised position;

Figure 4 is a side elevation of the jack and tractor of Figure 2 with the components of the jack obscured by the tractor indicated by broken lines;

Figure 5 is an enlarged perspective view from above and one side of the tractor mounted on the jack with the legs of the jack being deployed into the operating position of Figure 3 to support the tractor in the raised position, and

Figure 6 is a side elevation of a second embodiment of the invention in which the jack is adapted for use with two tractors.

Detailed Description of the Invention

[0019] As shown in the drawings, a jack in accordance with the invention for use in lifting tractors and other plant machinery having powered hydraulic arms is generally indicated by the reference numeral 1. As indicated above, the jack 1 can be adapted for use with a range of plant machinery and in particular plant machinery having hydraulically or pneumatically powered lifting arms. However, for the purposes of the following description, the jack will be described in relation to a tractor 2 having hydraulically powered arms for which it has particular utility. However, as will be appreciated by those skilled in the art, the jack 1 may be used with a range of plant machinery as required.

[0020] The jack 1 is made up of a substantially rectangular frame-like carriage 3 having a front end 4 and a rear end 5 which, as shall be explained more fully below, is disposed towards a reversing tractor 2 in use. The carriage 3 is formed by a first side beam 6, a second side beam 7 spaced apart from the first side beam 6, a front transverse bar 8 at the front end 4 of the carriage 3 connecting the first and second side beams 6,7 and a rear transverse bar 9 at the rear end 5 of the carriage 3 connecting the first and second side beams 6,7.

[0021] The carriage 3 is provided with a wheelset 10 at the rear end 5 to enable the tractor to

be moved when mounted on the jack 1. The wheelset 10 is made up of an axle 11 having a wheel 12 mounted at each end thereof. The axle 11 is mounted in axle mountings 13,14 which project rearwardly from the rear bar 9.

[0022] At its front end 4, the carriage 3 is provided with attachment means in the form of a first upright support 15 for receiving a first tractor lifting arm 35 and a second upright support 16 for receiving a second tractor lifting arm 36 which extend vertically upwards from the first side beam 6 and second side beam 7 respectively adjacent the transverse front bar 8. As indicated by the reference numeral 17, the first and second upright supports 15,16 are U-shaped in cross-section to define a channel 18 for receiving the lifting arms 35,36 of the three-point linkage 37 of a tractor 2.

[0023] The upright supports 15,16 can receive lifting arm pins 19 in openings 20. The lifting arm pins 19 are engageable with tractor lifting arms 35,36 to raise tractor 2 into the raised position.

[0024] The carriage 3 is further provided with a platform 21 located at its front end for holding a raised tractor 2 in the raised position. The platform 21 is attached to the front bar 8 and is made up of a first height adjustable upright leg 22 and a second height adjustable upright leg 23 located adjacent the upright supports 15,16 respectively. The first and second legs 22,23 are slidably mounted in respective sleeves 24,25 which are pivotably mounted on the front bar 8. The first and second legs 22,23 are provided with respective first and second feet 26,27 at their lower ends for resting on the ground in use and with leg height adjusting holes 28 along their length to adjust the position of the legs 22,23 within the sleeves 24,25 by inserting pins (not shown) through holes in the sleeves 24,25 into the height adjusting holes 28 of the legs 22,23.

[0025] The carriage 3 is further provided with a centrally located cross-beam 29 for reinforcing the carriage 3. A support bearing in the form of a cylindrical tractor positioning and support shaft 30 is mounted over the cross-beam 29 between first and second shaft mounting blocks 31,32 located on the first and second side beams 6,7 respectively. The mounting blocks 31,32 are each provided with a series of three notches 33 for receiving and altering the position of the shaft 30 on the carriage 3 while the shaft 30 is fitted with end plates 34 at each end for holding the shaft in place in the notches 33.

[0026] In use, a tractor 2 is positioned over the jack 1, e.g. reversed towards and over the jack 1 in the direction indicated by the arrow in Figure 1. Before reversing the tractor 2, the shaft 30 is positioned in the appropriate notches 33 of the mounting blocks 31,31 in accordance with the make/size of the tractor 2.

[0027] The first and second lifting arms 35,36 of the three-point linkage 37 of the tractor 2 are inserted into the channels 18 of the U-shaped uprights 17 of the upright supports 15,16 at the front end of the jack 1. Once positioned correctly in the upright supports 15,16, the lifting arm pins 19 are inserted through the openings 20 of the upright supports 15,16 to securely connect

the tractor arms 35,36 to the jack 1.

[0028] Using the hydraulic system of the tractor 2, the lifting arms 35,36 are then raised upwards to lift the front end 4 of the jack 1 causing the shaft 30 to be urged against the undercarriage of the tractor 2 as shown in Figure 4. Continued lifting by the lifting arms 35,36 causes the jack 1 to lift the tractor 2 from the ground at the shaft 30 so that the rear wheels 38 of the tractor 2 are raised from the ground as shown in Figures 2 and 4. The tractor 2 is therefore tilted or pivoted towards the rear end 5 of the jack 1 so that the wheelset 10 of the jack 1 bears the weight of the tractor 2 in substitution for the tractor rear wheels 38. The rear wheels 38 can therefore be removed and maintenance or cleaning operations can therefore be performed on the tractor 2 as required. In this position (as shown in Figures 2 and 4), the tractor 2 can also be moved or travel on the wheelset 10 and the front wheels (not shown) of the tractor 2 if desired. In this position, the legs 22,23 are in the raised inoperative position.

[0029] If desired, as shown in Figures 3 and 5, the legs 22,23 can then be released in their respective sleeves 24,25 and slide to the ground. Pins can then be inserted through the sleeves 24,25 and the height adjusting holes 28 so that upon slight lowering of the lifting arms 35,36, the tractor 2 is supported in the raised position on the legs 22,23 of the jack 1. As the legs 22,23 are pivotably mounted in the sleeves 24,25, the legs 22,23 automatically orient in the correct position on the ground while the feet 26,27 assist in compensating for uneven surfaces.

[0030] Moreover, in this position, if access is required to the tractor brakes and the like for maintenance purposes and it is desired or necessary to re-position the lifting arms 35,36, two adjustable attachment arms 39,40 can be mounted between the first and second legs 22,23 with mounting bolts and an attachment arm mounting 41 attachable to the tractor 2. Once the attachment arms 39,40 are secured in position, the lifting arms 35,36 can be detached from the upright supports 15,16 so that the tractor 2 is supported in the raised position by the attachment arms 39,40 with the lifting arms 35,36 in the released position.

[0031] In order to remove the jack 1 and lower the tractor 2 to the ground, the above operations are reversed.

[0032] Figure 6 is a side elevation of a second embodiment of the invention in which the jack is adapted for use with two tractors 2. As shown in the drawing, the jack 1 of the present embodiment is broadly similar to the jack 1 of Figures 1 to 5.

[0033] Accordingly, like numerals indicate like parts. However, in the present embodiment, the jack is provided with forwardly extending shoulder members 42 for attachment to a second tractor 2. The shoulder members 42 project from the upright supports 15,16 so that upon connection of the shoulder members 42 to a second tractor 2, the jack 1 can be employed to raise the second tractor 2 employing the hydraulics of the first tractor 2.

[0034] In an alternative embodiment of the invention, the legs 22,23 can be hydraulically

operated e.g. via a connection to the hydraulic system of the tractor 2 or a standalone hydraulic system.

REFERENCES CITED IN THE DESCRIPTION

Cited references

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Patent documents cited in the description

- [US2548695A](#) [0004]
- [US2555471A](#) [0004]
- [US2463305A](#) [0004]
- [GB2335909A](#) [0004]
- [FR2963598A](#) [0004]

Patentkrav**1.** Donkraft (1) omfattende:

5 en vogn (3), som har en forende (4) og bagende (5) til placering under et køretøj (2), som har en løftearm (35,36) og fastgørelsesorgan (15,16) til at fastgøre vognen (3) til løftearmen (35,36), hvor fastgørelsesorganet (15,16) kan samarbejde med løftearmen (25,36) til at løfte køretøjet (2) op på vognen (3) og

et hjulsæt (10) på bagenden (5) af vognen (3) konfigureret til at bære vægten af køretøjet (2),

10 hvor vognen (3) er drejeligt bevægelig på hjulsættet (10) mellem en første position i hvilken fastgørelsesorganet (15,16) kan fastgøres til løftearmen (35,36) og en anden hævet position i hvilken vognen (3) kan støtte køretøjet (2) på hjulsættet (10), **kendetegnet ved, at** vognen (3) omfatter en platform (21) til at holde et hævet køretøj (2) i en hævet position og platformen (21) omfatter et par af med afstand anbragte højdejusterbare ben (22,23), hvor de højdejusterbare ben (22,23) støtter køretøjet (2) i den hævede position.

20 **2.** Donkraft (1) ifølge krav 1, hvor fastgørelsesorganet (15,16) omfatter mindst én opretstående støtte (15,16) på vognen (3).

3. Donkraft (1) ifølge krav 1 eller 2, hvor vognen (3) yderligere omfatter et støtteleje (30) mellem forenden (4) og bagenden (5) til at støtte et køretøj (2).

25 **4.** Donkraft (1) ifølge krav 3, hvor støttelejet (30) omfatter en tværgående aksel (30) på vognen (3).

5. Donkraft (1) ifølge krav 1, hvor benene (22,23) er drejeligt monteret på vognen (3).

30

6. Donkraft (1) ifølge krav 5, hvor donkraften (1) yderligere omfatter en fastgørelsesarm (39,40) frigørligt monterbar mellem donkraften (1) og et køretøj (2).

5 **7.** Donkraft (1) ifølge krav 6, hvor fastgørelsesarmen (39,40) omfatter et par af fastgørelsesarme (39,40) monterbare mellem donkraften (1) og køretøjet (2).

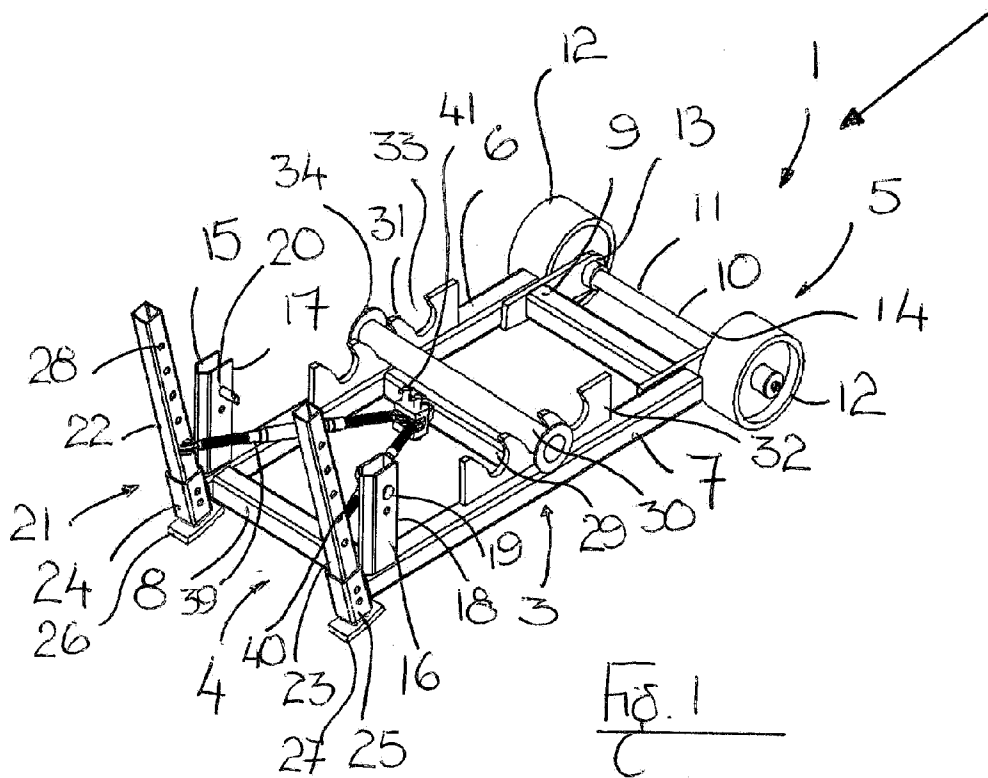
8. Donkraft (1) ifølge krav 7, hvor parret af fastgørelsesarme (39,40) er monterbare mellem platformen (21) og køretøjet (2).

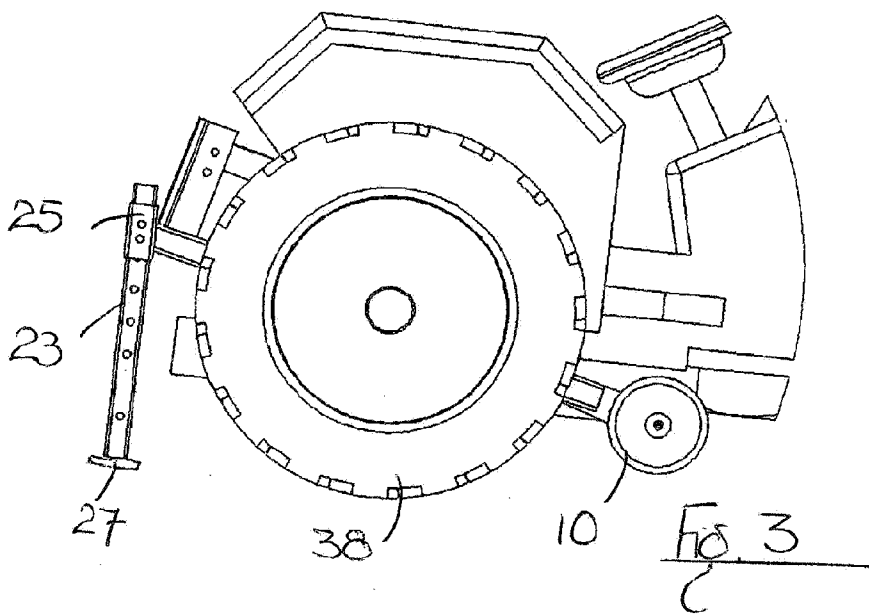
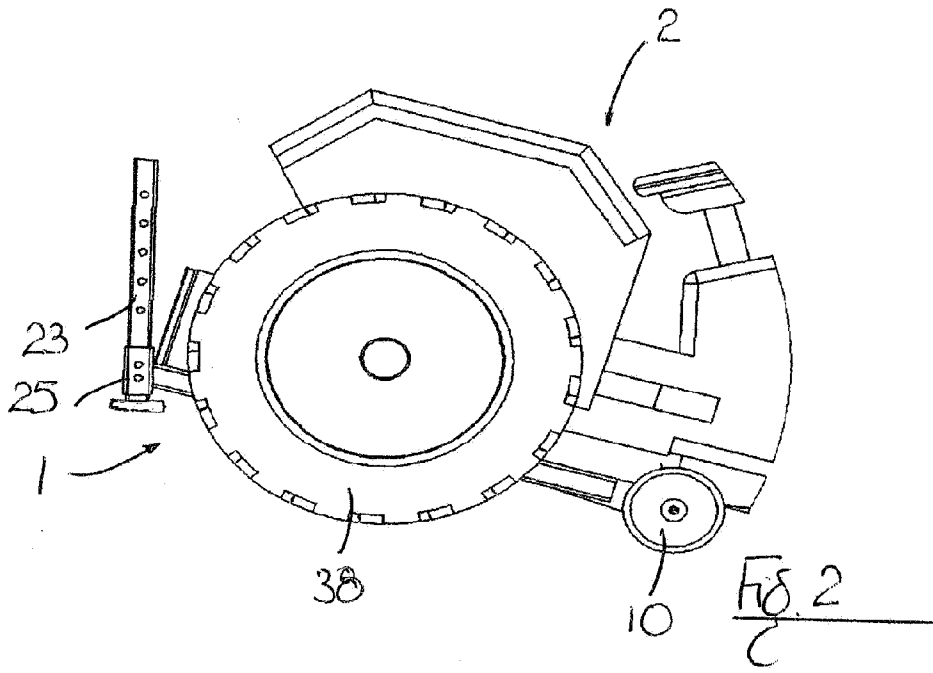
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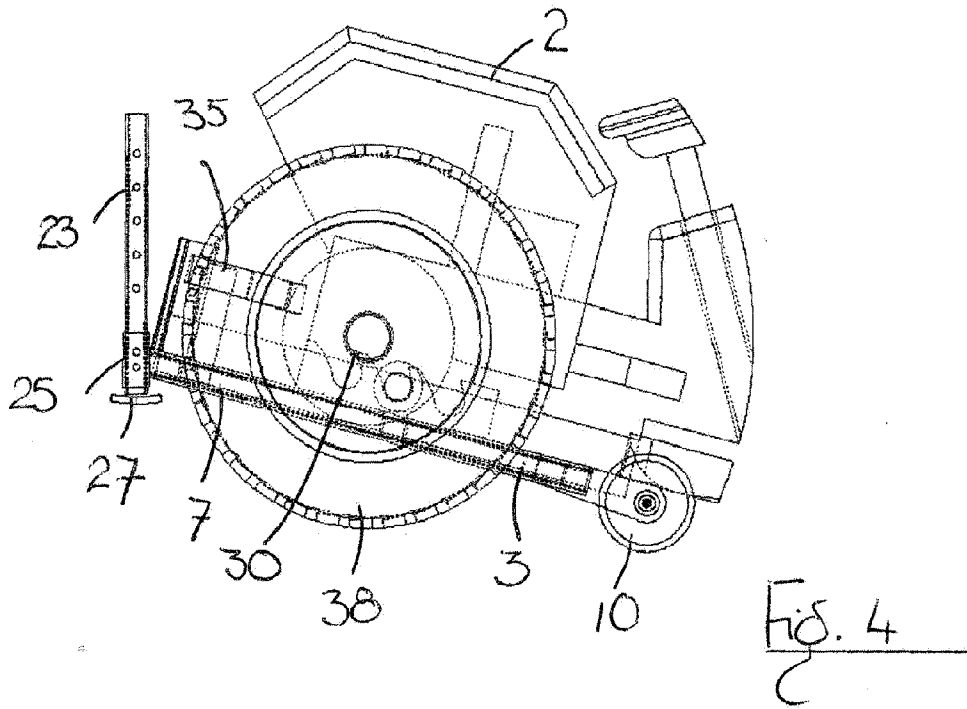
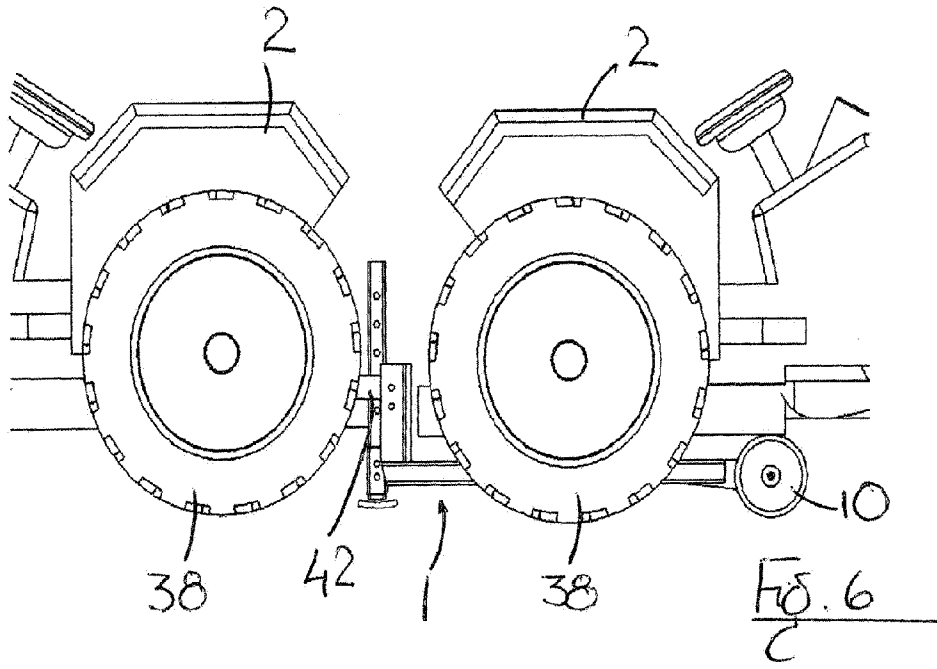
9. Donkraft (1) ifølge et hvilket som helst af kravene 2 til 8, hvor donkraften (1) omfatter en skulder (42) til at fastgøre donkraften (1) til et andet køretøj (2).

10. Donkraft (1) ifølge krav 9, hvor skulderen (42) er monteret på stolpen
15 (15,16).

DRAWINGS







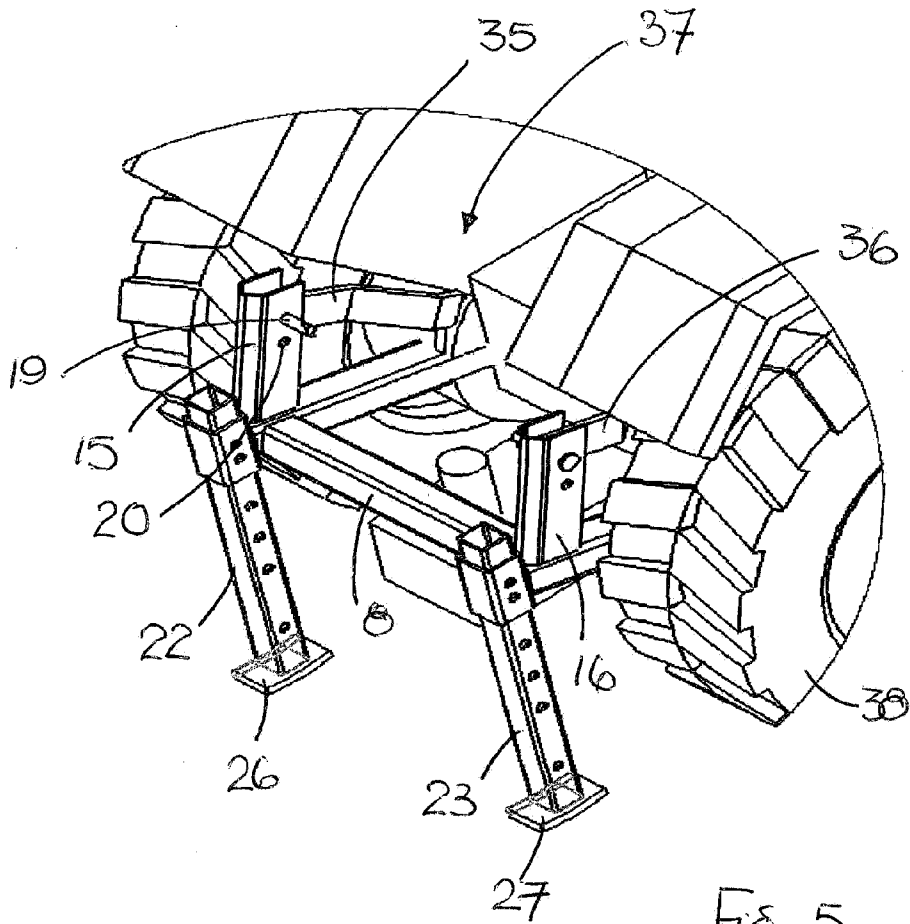


FIG. 5
C