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(54) **A MINE-DISPOSAL ASSEMBLY AND THE WAY OF ITS OPERATING**

MINENRÄUMVORRICHTUNG UND VERFAHREN ZU DESSEN ANWENDUNG

ENSEMBLE DE DEMINAGE ET SON MODE DE FONCTIONNEMENT

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- **""MINI-FLAIL"" SOLDAT UND TECHNIK, vol. 39, no. 12, December 1996, page 836 XP000641240**

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EP 0 929 789 B1

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The presented invention relates to a mine-disposal assembly for the removal of explosives from the mined territories and the way of its operating.

Description of the Related Art

[0002] The machines for the removal of explosives from the mined territories known so far are constructed in such a way that the activating equipment, which is mostly operated from the cabin of a conveyance or from the other cabin provided for this purpose, is as a rule replaceably or removably attached directly to a tractive conveyance on track or wheeled bogies from its rear or front side.

[0003] For the service staffs of both the machine and the activating equipment, which consist of at least one person, it is dangerous to be present close to the source of explosion while operating the machine, when mines are digged out by hammers of bumping flails, activated by their hits, or unsufficiently removed and may explode after passage of a track or wheel of the machine.

[0004] From the reason of minimizing the risk for the service staffs the operational cabines are placed as far as possible from the sources of explosions and are equipped with a safety armour; the activating equipment is separated from the cabins with covers as well, however, the risk of an injury or killing the service staffs still persists, which is the main drawback of these machines.

[0005] Other drawbacks are heavy weight and constructional bulkiness of the machines which result in their low exploitation on great gradient hillslopes, in narrow slots and at similar places.

[0006] From the DE-A1-3 841 303 a mine-disposal assembly according to the preamble of the attached claim 1 is known.

[0007] This assembly has a boom-like manipulating arm which is together with other parts of the assembly at least partly exposed to damage during an explosion of mines.

Summary of the invention

[0008] An object of the present invention is to create a mine-disposal assembly according to the preamble of the attached claim 1 in which assembly the mine-disposal unit is able to follow automatically the terrain of the area and in which assembley many of its parts are protected against mine explosions.

[0009] That object is solved by the features of claim 1.

[0010] The invention has besides the protection of the manipulating arm and the swinging clamp further the advantage that the mine-disposal unit remains in contact with the terrain and follows the terrain in both longitudinal and transversal planes.

[0011] A further advantageous performance of the invention deals with the structure of the mine-disposal unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The mine-disposal assembly and the way of its operating is explained more in detail in the enclosed drawings where:

Fig. 1 shows the complete assembly in its operational position,
Fig. 2 shows the mine-disposal unit consisting of the mine-disposal machine and the activating equipment,
Fig. 3 schematically shows the movable mechanisms of the particular tilting components,
Fig. 4 shows the particular basic components of the swinging clamp and activating equipment,
Fig. 5 shows the main parts of the shape of the protective shield,
Fig. 6 shows in the block scheme the radio-electro-hydraulic control of the complete assembly with two variants of connecting the mobile part of the mine-disposal machine.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] The mine-disposal assembly is as an example shown in Fig. 1. It consists of a conveyance 1 which is a lorry on the bed of which the cabin of the service workplace 2 with a remote controller 21 is installed and also the mine-disposal machine 3 with the receiver 31 whereto the activating equipment 4 is connected through the swinging clamp 5.

[0014] The mine-disposal machine 3 itself (see Fig. 2) consists of the bogie whereon the first and the second mobile wheels 33, 34 controlled by the hydraulic engines 35, 36 (not shown in Fig. 2) are placed from both left and right side. The bogie is firmly attached to the frame whereon the machine cabin (not shown in Fig. 2) with the protective shield 39 is placed. In the upper part the doubled manipulating arm 37 is connected to the frame of the mine-disposal machine 3 through the swinging frame joints 38 along both its sides and in the lower part the activating equipment 4 is fixed thereto through the swinging clamp 5. The connection of this activating equipment 4 (see also Fig. 4) is realized in such a way that in the lower part the arm plate 52 is interconnected swingingly with the doubled manipulating arm 37 through the arm joint 51 and in the upper part it is swingingly interconnected with the clamping plate 54 through the activating joint 53.

[0015] To the arm 55 of the activating equipment 4, which is firmly connected with the clamping plate 54, the rotary hanger 56 is attached. On the activating frame 46

the protective shield 6 and from the bottom side the guide skids 45 are fixed through the side bearers 42 from both sides. The activating hydraulic engine 41 of the activating equipment 4, installed on the rotary axle 43 with the bumping flails 44, is connected to the hydraulic system (not shown in Fig. 2 and Fig. 4) of the mine-disposal machine 3 through a hydraulic hose.

[0016] From the simplified scheme (see Fig. 3) of motion freedom of the particular elements it is obvious that the frame joint 38, the arm joint 51 and the activating joint 53 are freely movable in the vertical direction and the rotary hanger 56 is freely movable in the horizontal direction which provides thorough copying of the terrain in both its longitudinal and transversal planes.

[0017] The protective shield 6 of the activating equipment 4 is constructed of the shaped metal plate (see Fig. 5). Its upper part is formed with the deflector 61 bent under the angle tilt of the line coming out of the point in the place of an activated mine 47. The part of the plate under the deflector 61 is formed as a bumper 62 with the angle tilt α which is equal to 70°.

[0018] Operating the mine-disposal assembly according to the presented invention is clear from the simplified scheme (see Fig. 6). The operator in the cabin of the workplace 2 manipulates the operating elements of the remote controller 21 also consisting of the control processor, radiomodem, source (not shown in the drawings) and the transmitting antenna 211 (see Fig. 1). The radio signal 213 is emitted by the transmitting antenna 211 and transmitted through the radiowaves into the receiver 31, placed in the mobile mine-disposal machine 3, through its receiving antenna 311. The radio signal 213 is processed in the receiver 31 through its radiomodem and control processor (not shown in the drawings) and the corresponding commands are sent into the electrohydraulic systems 313 in the form of the electric signal 312. The hydraulic signal 314 controls the corresponding hydrogenerators 32 and consequently the hydraulic engines 35, 36 and 41. The first hydraulic engine 35 then sets the first mobile wheels 33 spinning, the second hydraulic engine 36 sets the second mobile wheels 34 spinning and the activating hydraulic engine 41 sets the rotary axle 43 with the bumping flails 44 spinning.

[0019] The mine-disposal assembly is transported to the mined area by the lorry 1 on the bed of which is the cabin of the service workplace 2 and two pieces of the activating equipment 4, one of them as a spare part. At the same time on the trailer carriage the mine-disposal machine 3 is delivered whose first mobile wheels 33 and second mobile wheels 34 are manipulated by the operator in the way described above and the mine-disposal machine is backed on the ground. Through the swinging clamp 5 the activating equipment 4 is fixed to the doubled manipulating arm 37 and the mine-disposal assembly is ready to dispose mines.

[0020] The mine-disposal of the area is performed in the way that the mine-disposal machine 3 is placed at the beginning of the area, the rotary axle 43 with the bumping flails 44 is set spinning in the above mentioned way and the mine-disposal machine 3 is set to motion by setting the first mobile wheels 33 and the second mobile wheels 34 spinning. The bumping flails 44 dig or knock off the mined area, bump and thus activate the mines 47 which results in their removal from the mined area.

[0021] After finishing the mine-disposal the mine-disposal machine 3 and the activating equipment 4 are placed on the conveyance and driven away from the place of the mine-disposal.

Industrial Exploitation

[0022] The mine-disposal assembly is mainly determined to remove mines from the mined areas in peace conditions. Besides effective liquidation of antiinfantry and antitank mines, it reliably removes weed and low shrubbery.

[0023] After simple modification of removing the cover from the mine-disposal machine and exchange of the activating equipment for another accessory, such as a loading platform, loading tank, lawn mower, equipment for drilling, mixing concrete, cleaning pavements, snow removal and many others the mine-disposal machine provides multipurpose exploitation with a tender directly in its cabin.

Claims

1. Mine-disposal assembly comprising a remote-controllable conveyance (3) to which a manipulating arm (37) is attached vertically movably by means of a frame joint (38), the joint-distant end of the manipulating arm (37) being connected to a mine-disposal unit (4) which is in contact with the terrain, comprises means allowing a free motion of the mine-disposal unit (4) in the vertical and horizontal directions and is protected by a shield (6) mounted on the mine-disposal unit (4),
characterized in that the manipulating arm (37) is inclined at the front of the conveyance (3) towards the terrain and is protected by a shield (39) attached to the conveyance (3), that the said means are formed by a swinging clamp (5) which is placed between the joint-distant end of the manipulating arm (37) and the mine-disposal unit (4) and is composed of two plates (52, 54), an arm plate (52) and a clamping plate (54), connected with one another at their upper ends by an activating joint (53), the lower end of the arm plate (52) being connected to the manipulating arm (37) by means of an arm joint (51) and the clamping plate (54) being firmly connected to an arm (55) of the mine-disposal unit (4) the arm (55) being connected to an activating frame (46) of the mine-disposal unit (4) through a rotary hanger (56).

2. Mine-disposal assembly according to claims 1, **characterized in that** the protective shield (6) mounted on the mine-disposal unit (4) is fixed on the activating frame (46), that on the soil side of the activating frame (46) guide skids (45) are attached and that in the front part of the mine-disposal unit (4) bumping flails (44) are placed on a rotary axle (43) combined with an activating hydraulic motor (41).

Patentansprüche

1. Minenbeseitigungsvorrichtung mit einem fernsteuerbaren Fahrzeug (3), an dem ein Stellarm (37) mittels eines Rahmengelenks (38) vertikal beweglich befestigt ist, wobei das diesem Rahmengelenk abgewandte Ende des Stellarms (37) mit einer in Kontakt mit dem Gelände stehenden Minenbeseitigungseinheit (4) verbunden ist, ferner mit Mitteln, die eine freie Bewegung der Minenbeseitigungseinheit (4) in vertikaler Richtung und horizontaler Richtung erlauben, und mit einem an der Minenbeseitigungseinheit (4) befestigten Schutzschild (6),
dadurch gekennzeichnet,
dass der Stellarm (37) zur Vorderseite des Fahrzeugs (3) zum Gelände hin geneigt und durch einen am Fahrzeug befestigten Schild (39) geschützt ist, dass die genannten Mittel durch ein Schwinggelenk (5) gebildet sind, das zwischen dem geneigten Ende des Stellarms (37) und der Minenbeseitigungseinheit (4) angeordnet und aus zwei Platten (52, 54), nämlich einer Armplatte (52) und einer Schwinggelenkplatte (54), besteht, die an ihren oberen Enden mittels eines Aktivierungsgelenks (53) miteinander verbunden sind, wobei das untere Ende der Armplatte (52) mittels eines Armgelenks (51) mit dem Stellarm (37) verbunden ist, die Schwingarmplatte (54) mit einem Arm (55) der Minenbeseitigungseinheit (4) fest verbunden ist und dieser Arm (55) mittels eines drehbaren Aufhängers (56) mit einem Aktivierungsrahmen (46) verbunden ist.

2. Minenbeseitigungsvorrichtung nach Anspruch 1,
dadurch gekennzeichnet,
dass der an der Minenbeseitigungseinheit (4) befestigte Schutzschild (6) am Aktivierungsrahmen (46) der Minenbeseitigungseinheit (4) befestigt ist, dass auf der Erdbodenseite des Aktivierungsrahmens (46) Gleitkufen (45) befestigt sind und dass auf der Vorderseite der Minenbeseitigungseinheit (4) Stoßflegel (44) auf einer Drehwelle (43) angeordnet sind, die mit einem aktivierenden Hydraulikmotor (41) zusammenarbeiten.

Revendications

1. Ensemble de déminage comprenant un engin de transport pouvant être commandé à distance (3) auquel un bras de manipulation (37) est fixé de manière verticalement mobile à l'aide d'un assemblage de cadre (38), l'extrémité éloignée de l'assemblage du bras de manipulation (37) étant reliée à une unité de déminage (4) qui est en contact avec le terrain, comprend des moyens permettant un mouvement libre de l'unité de déminage (4) dans les directions horizontale et verticale et est protégé par un écran (6) monté sur l'unité de déminage (4),
caractérisé en ce que le bras de manipulation (37) est incliné à l'avant de l'engin de transport (3) en direction du terrain et est protégé par un écran (39) fixé à l'engin de transport (3), **en ce que** lesdits moyens sont constitués d'un dispositif de serrage orientable (5) qui est placé entre l'extrémité éloignée de l'assemblage du bras de manipulation (37) et l'unité de déminage (4) et se compose de deux plaques (52, 54), d'une plaque de bras (52) et d'une plaque de serrage (54), reliées l'une à l'autre au niveau de leur extrémité supérieure par un assemblage d'actionnement (53), l'extrémité inférieure de la plaque de bras (52) étant reliée au bras de manipulation (37) au moyen d'un assemblage de bras (51) et la plaque de serrage (54) étant solidement reliée à un bras (55) de l'unité de déminage (4), le bras (55) étant relié à un cadre d'actionnement (46) de l'unité de déminage (4) par l'intermédiaire d'un crochet rotatif (56).

2. Ensemble de déminage selon la revendication 1, **caractérisé en ce que** l'écran de protection (6) monté sur l'unité de déminage (4) est fixé sur le cadre d'actionnement (46), **en ce que** des cales de guidage (45) sont fixées du côté sol du cadre d'actionnement (46), et **en ce que** des fléaux d'impact (44), à la partie avant de l'unité de déminage, sont placés sur un essieu rotatif (43) en association avec un moteur hydraulique d'actionnement (41).

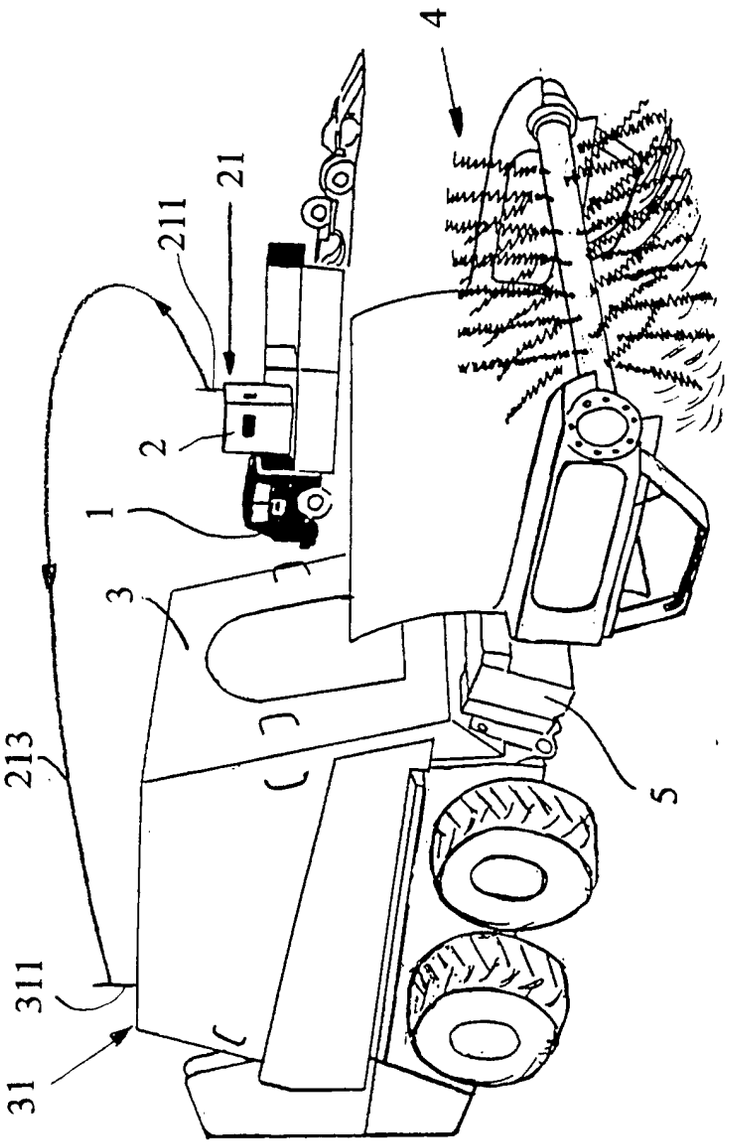


Fig 1.

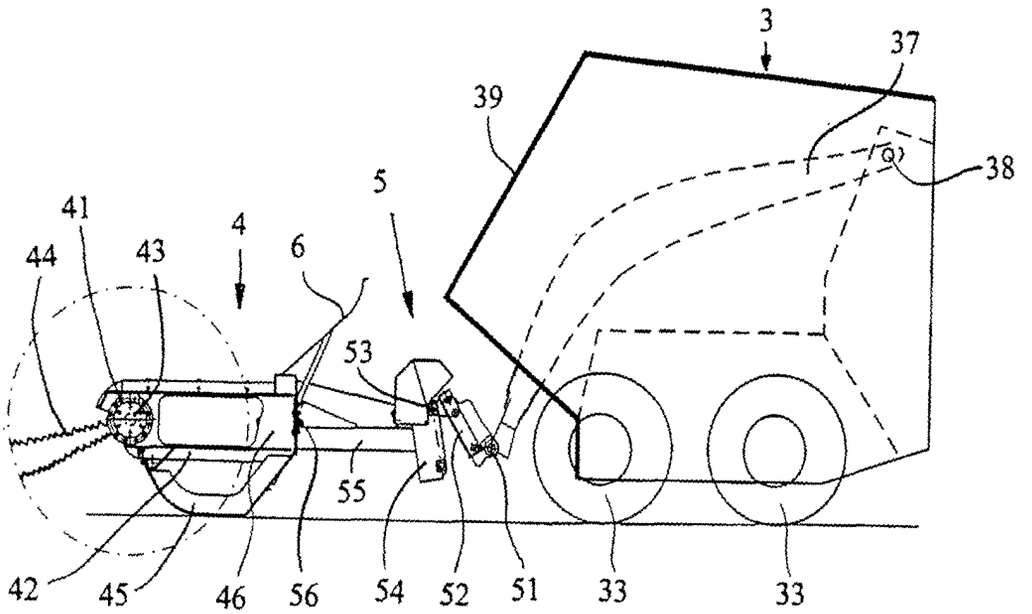

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Fig 2.

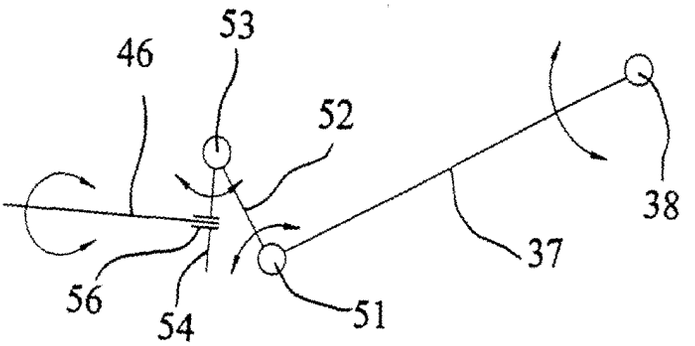

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Fig 3.

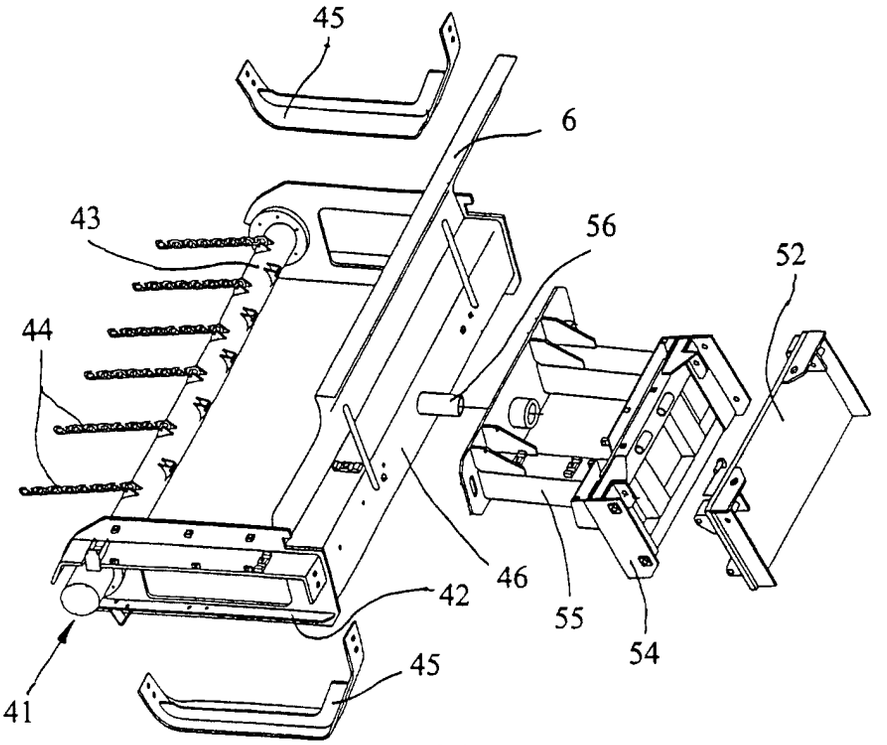


Fig 4.

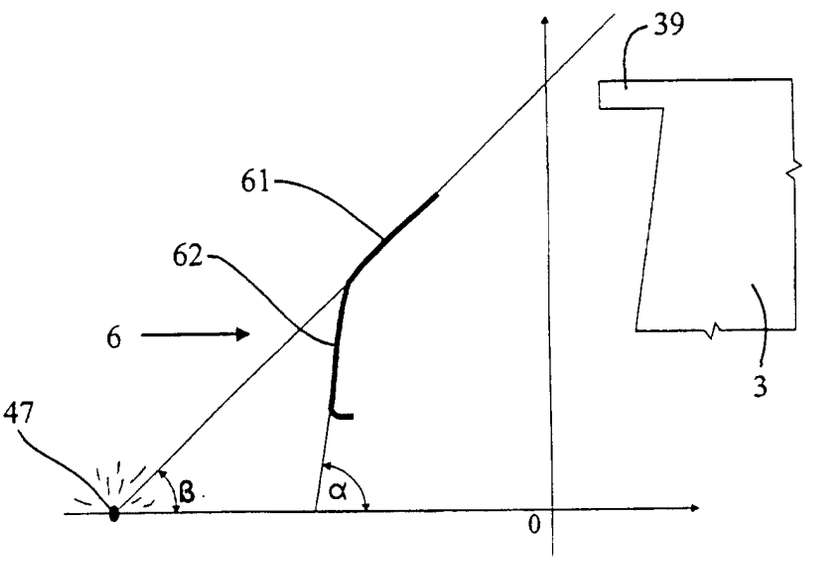


Fig 5.

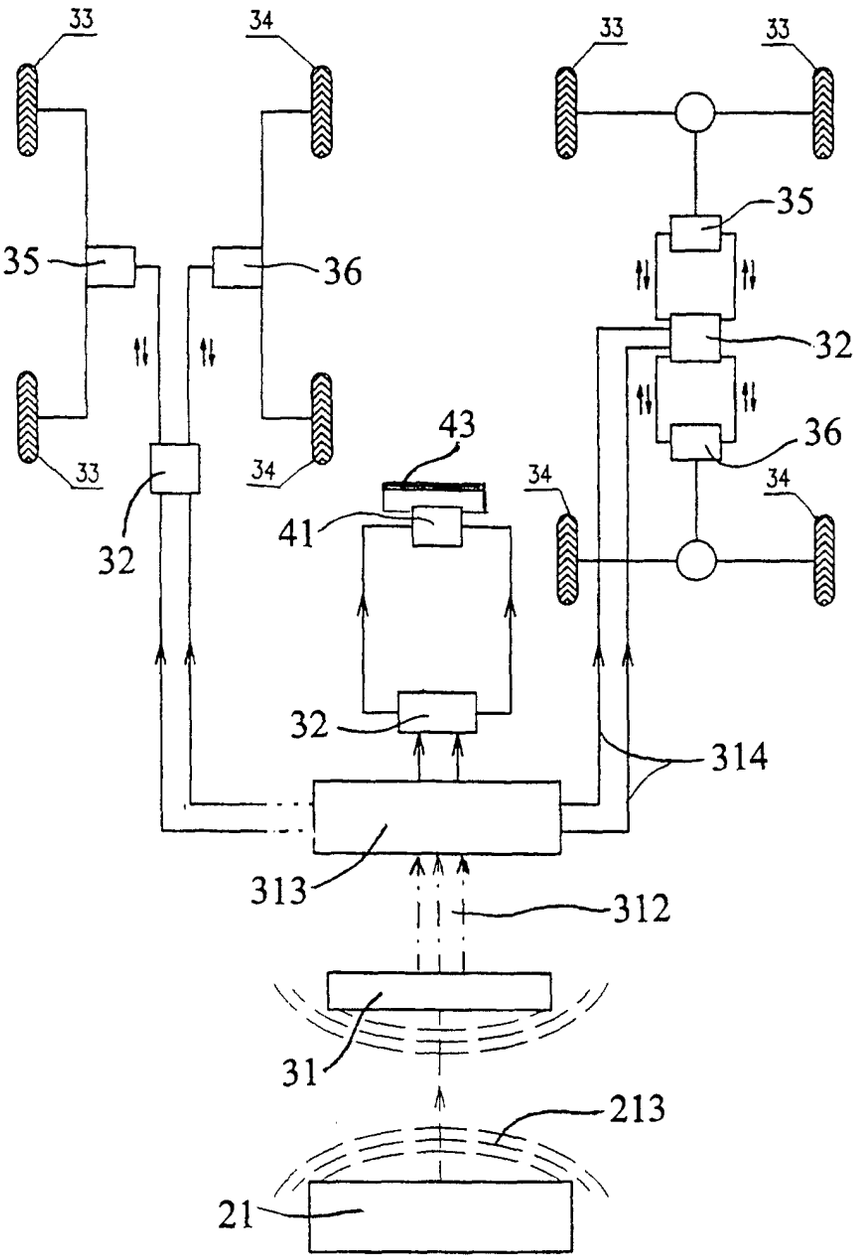

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Fig 6.