

Fracturing pump transmission system and fracturing truck

Abstract

The utility model relates to the technical field of fracturing trucks, and discloses a fracturing pump transmission system and a fracturing truck. The fracturing pump transmission system comprises one or more engines, a plurality of oil pumps and a plurality of motors, wherein when one engine is used, the engine is used for driving the oil pumps; when multiple engines are used, each engine is used for driving at least one oil pump; each oil pump is connected with at least one motor; the motors are used for driving a fracturing pump. Compared with the prior art, by the implementation of the fracturing pump transmission system, the type selection range of related parts of the transmission system can be effectively enlarged, multiple matching modes can be achieved, cost of the related parts can be effectively reduced, meanwhile reliability can be effectively improved, and realization of forward and reverse rotation of the fracturing pump is also facilitated. The fracturing truck is provided with the fracturing pump transmission system. Thus, manufacturing cost and production difficulty of the fracturing truck can be effectively reduced, and operation efficiency and maintainability can be effectively improved at the same time.

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1. a fracturing pump transmission system, is characterized in that, described fracturing pump transmission system comprises one or more motor (1), a plurality of oil pump (2) and a plurality of motor (4), wherein:

When motor (1) is one, motor (1) is for driving a plurality of oil pumps (2), and when motor (1) is a plurality of, each motor (1) is for driving oil pump (2) described at least one; Each oil pump (2) is connected to motor (4) described at least one; A plurality of motors (4) are all for driving fracturing pump (5).
2. fracturing pump transmission system as claimed in claim 1, it is characterized in that, the oil outlet of each oil pump (2) is connected to respectively first hydraulic fluid port of at least one motor (4) by corresponding oil circuit, second hydraulic fluid port of this at least one motor (4) is connected to hydraulic oil container (3); Or the oil outlet of described a plurality of oil pumps (2) is all connected to the first hydraulic fluid port of described a plurality of motor (4) by the first oil circuit (6), the second hydraulic fluid port of described a plurality of motors (4) is connected to hydraulic oil container (3).
3. fracturing pump transmission system as claimed in claim 1, it is characterized in that, described fracturing pump (5) is curved shaft type plunger pump, the two ends of described curved shaft type plunger pump are provided with power input gear (51), and each motor (4) is by power output gear (41) and described power input gear (51) engagement.
4. fracturing pump transmission system as claimed in claim 3, is characterized in that, the number of the power output gear (41) that the power input gear (51) at described curved shaft type plunger pump two ends meshes is identical.
5. fracturing pump transmission system as claimed in claim 4, is characterized in that, the power output gear (41) that the power input gear (51) of the arbitrary end of described curved shaft type plunger pump meshes is evenly arranged around this power input gear (51).
6. the fracturing pump transmission system as described in claim 1 to 5 any one, is characterized in that, when described motor (1) is a plurality of, one of them is fracturing unit truck engine in situ.
7. a fracturing unit truck, comprises chassis (10) and fracturing pump (5), it is characterized in that, is provided with the fracturing pump transmission system described in claim 1 to 6 any one on the car body (11) of described chassis (10).
8. fracturing unit truck as claimed in claim 7, is characterized in that, under the situation that does not comprise engine in situ in fracturing pump transmission system, described at least one motor (1), described fracturing pump (5) are installed on described car body (11) from front to back successively.
9. fracturing unit truck as claimed in claim 8, is characterized in that, described fracturing unit truck also comprises hydraulic oil container (3), and described hydraulic oil container (3) is arranged at the first area of described a plurality of motor (1) top.

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Worldwide applications

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10. fracturing unit truck as claimed in claim 8, is characterized in that, described fracturing unit truck also comprises cooler bin (12), and described cooler bin (12) is arranged at the second area of described a plurality of motor (1) top.

Description

Fracturing pump transmission system and fracturing unit truck

Technical field

The utility model relates to fracturing unit truck technical field, particularly fracturing pump transmission system and fracturing unit truck.

Background technique

Pressing crack construction operation is one of important means of transformation oil-gas reservoir, for low-permeability oil gas well, generally need to just can reach the object of stable yields and volume increase by means of fracturing work. Fracturing unit truck is the capital equipment of pressing crack construction, and its effect is the fracturing fluid that injects high pressure, large discharge capacity in stratum, and stratum is pressed off, supporting material (as fracturing sand) is clamp-oned to crack, to strengthen in-place permeability, increase the mobility of oil gas, improve the rate of oil and gas recovery.

At present, common fracturing unit truck adopts the transmission scheme of " diesel engine-fluid torque converter-transmission shaft-fracturing pump ", in this scheme, after diesel engine starts, after fluid torque converter speed change, bending moment, by transmission shaft, drive fracturing pump to rotate, to realize fracturing work; The power required due to fracturing work is larger, thereby in order to meet the demands, the power of diesel engine is also wanted enough large (can meet peak output), and in addition, diesel engine need to depend on from the starting motor of engine in situ power taking could realize startup.

In above-mentioned transmission scheme, because needs are selected the diesel engine that meets peak output, when surpassing certain power (as 1500KW), required cost will rise rapidly, and type selecting difficulty, so also causes supporting the Component selection narrow range such as torque-converters, price high; Above-mentioned transmission scheme type selecting difficulty and another higher factor of cost are, worldwide, the fracturing work related elements of every country and the technology maturity of parts and industrial chain sophistication differ larger, diesel engine, fluid torque converter or the transmission shaft etc. that form above-mentioned transmission scheme need to be bought from some country, by causing, use the fracturing unit truck of this transmission scheme with high costs like this, and be subject to the restriction of import parts cycle and the source of goods.

In addition, the safety redundancy of above-mentioned transmission scheme (reliability) is low, once any in diesel engine, fluid torque converter and transmission shaft breaks down, to cause fracturing work to stop, because fracturing work place is generally positioned at remote districts, and these parts are expensive, be difficult to disposable preparing enough, even if in the relatively ripe country of fracturing work technical development, recovering fracturing work also needs for a long time.

Therefore, how for existing above-mentioned deficiency and defect, improving, to more adapt to oil and gas development needs, is those skilled in the art's technical problems urgently to be resolved hurriedly.

Model utility content

In view of this, one of the purpose of this utility model is to provide a kind of fracturing pump transmission system, effectively to reduce type selecting difficulty and the cost of fracturing pump transmission system associated components, also effectively improves the safety redundancy of fracturing pump transmission system simultaneously.

Particularly, this fracturing pump transmission system comprises one or more motors, a plurality of oil pump and a plurality of motor, wherein: when motor is one, motor is used for driving a plurality of oil pumps, when motor is a plurality of, each motor is used for driving oil pump described at least one; Each oil pump is connected to motor described at least one; A plurality of motors are all for driving fracturing pump.

Further, the oil outlet of each oil pump is connected to respectively the first hydraulic fluid port of at least one motor by corresponding oil circuit, and the second hydraulic fluid port of this at least one motor is connected to hydraulic oil container; Or the oil outlet of described a plurality of oil pumps is all connected to the first hydraulic fluid port of described a plurality of motors by the first oil circuit, the second hydraulic fluid port of described a plurality of motors is connected to hydraulic oil container.

Further, described fracturing pump is curved shaft type plunger pump, and the two ends of described curved shaft type plunger pump are provided with power input gear, and each motor meshes by power output gear and described power input gear.

The number of the power output gear that further, the power input gear at described curved shaft type plunger pump two ends meshes is identical.

Further, the power output gear that the power input gear of the arbitrary end of described curved shaft type plunger pump meshes is evenly arranged around this power input gear.

Further, when described motor is a plurality of, one of them is fracturing unit truck engine in situ.

The second object of the present utility model is to provide a kind of fracturing unit truck, effectively to reduce manufacture cost and the production difficulty of fracturing unit truck, effectively improves operating efficiency and maintainability simultaneously.

Particularly, described fracturing unit truck comprises chassis and fracturing pump, is provided with the fracturing pump transmission system described in above-mentioned any one on the car body on described chassis.

Further, under the situation that does not comprise engine in situ in fracturing pump transmission system, described at least one motor, described fracturing pump are installed on described car body from front to back successively.

Further, described fracturing unit truck also comprises hydraulic oil container, and described hydraulic oil container is arranged at the first area of described a plurality of motors top.

Further, described fracturing unit truck also comprises cooler bin, and described cooler bin is arranged at the second area of described a plurality of motors top.

While adopting fracturing pump transmission system of the present utility model, owing to adopting a plurality of oil pumps of at least one engine-driving, a plurality of oil pumps are a plurality of motor supply pressure oil, a plurality of motors all drive fracturing pump, effective like this type selecting scope that expands transmission system associated components, effectively reduce enforcement difficulty, be also convenient to realize multiple matching way, and the control of being convenient to realize fracturing pump rotating speed and output power; In addition, while adopting a plurality of motor, meeting under the prerequisite of peak output, the power that each motor is born can effectively reduce, thereby, can select common low-powered engine, the further like this type selecting scope that expanded, correspondingly, each oil pump and each motor type selecting scope also can further expand; In addition, adopt after this kind of drive, each motor, each oil pump and each motor are

easy to obtain, and without being subject to import, special-purpose restriction, thereby can effectively reduce the component costs of fracturing pump transmission system; In addition, adopt after this kind of drive, if after some motors, oil pump or motor damage, whole transmission system still can guarantee that fracturing work proceeds a period of time, thereby effectively improved safety redundancy (reliability), reduced construction party the risk of losing has occurred; In addition, adopt after this kind of drive, be convenient to by hydraulic control, realize the clockwise and anticlockwise of motor, and then the clockwise and anticlockwise that realizes fracturing pump (in prior art, is limited to its transmission scheme, fracturing pump can only be followed diesel engine one-way rotation), expanded the function of fracturing unit truck.

In a kind of optional scheme, one of them of a plurality of motors is fracturing unit truck engine in situ, given full play to like this utilization efficiency of engine in situ, and engine in situ can be played a role in the process of walking, in operation process, also can play a role.

Fracturing unit truck of the present utility model has above-mentioned fracturing pump transmission system, thereby can effectively reduce manufacture cost and the production difficulty of fracturing unit truck, can effectively improve operating efficiency and maintainability simultaneously.

Accompanying drawing explanation

The accompanying drawing that forms a part of the present utility model is used to provide further understanding of the present utility model, and schematic description and description of the present utility model is used for explaining the utility model, does not form improper restriction of the present utility model. In the accompanying drawings:

The composition schematic diagram of a kind of fracturing pump transmission system that Fig. 1 provides for the utility model embodiment;

Fig. 2 is the structural representation that a plurality of motors drive a kind of optimal way of fracturing pumps in embodiment illustrated in fig. 1;

The structural representation of a kind of fracturing unit truck that Fig. 3 provides for other embodiments of the utility model.

Description of reference numerals:

1 motor

2 oil pumps

3 hydraulic oil containers

4 motors

5 fracturing pumps

6 first oil circuits

7 second oil circuits

10 chassis

11 car bodies

12 cooler bins

41 power output gears

51 power input gears

Embodiment

It should be pointed out that in this part to be only the explanation to specific embodiment to the description of concrete structure and description order, should not be considered as that protection domain of the present utility model is had to any restriction. In addition, under the situation of not conflicting, embodiment and the feature in embodiment in this part can combine mutually.

Please refer to Fig. 1, Fig. 2 and Fig. 3, below in conjunction with accompanying drawing, the utility model embodiment is elaborated.

Shown in Fig. 1, the utility model embodiment's fracturing pump transmission system can comprise a plurality of motors 1, a plurality of oil pump 2 and a plurality of motor 4, for the ease of understanding, also shows fracturing pump 5 in Fig. 1. In this application, "a plurality of" refer to more than two and two.

Wherein, each motor 1 is for driving at least one oil pump 2, and a plurality of oil pumps 2 are used to a plurality of motor 4 supply pressure oil, and a plurality of motors 4 are all for driving fracturing pump 5.

In specific implementation process, the line shaft of the clutch end of each motor 1 and at least one oil pump 2 is in transmission connection, and certainly on this is in transmission connection circuit, can also the parts such as transfer case be set as required, and the utility model is embodiment be not restricted this. Shown in Fig. 1, the inlet port of each oil pump 2 is connected to hydraulic oil container 3, the oil outlet of each oil pump 2 can be by being connected to the first hydraulic fluid port of a plurality of motors 4 behind the first oil circuit 6 interflow, be a plurality of motor 4 supply pressure oil, the second hydraulic fluid port of a plurality of motors 4 passes through the second oil circuit 7 to hydraulic oil container 3 oil returns simultaneously; It should be noted that, in Fig. 1, a plurality of oil pumps 2 adopt interflow mode to a plurality of motor 4 fuel feeding, but under other situations, also can make each oil pump 2 be connected at least one motor 4 by corresponding oil circuit, be that each oil pump 2 is at least one motor 4 supply pressure oil, in addition corresponding control valve (or control valve group) can also be set on the oil circuit between oil pump 2, motor 4 and hydraulic oil container 3, to control the oil inlet and oil return state of motor 4; The scheme that relevant single oil pump or a plurality of oil pump are controlled single-motor or a plurality of motors by control valve group can, referring to the associated description of prior art, no longer be launched explanation at this.

In addition, in specific implementation process, it is varied that a plurality of motors 4 drive the mode of fracturing pump 5 to have, as long as can realize motor 4, drives fracturing pump 5 to rotate, and the utility model is embodiment be not restricted this. A kind of mode that is preferably in transmission connection between motor 4 and fracturing pump 5 has been shown in Fig. 2, as shown in Figure 2, this fracturing pump 5 is curved shaft type plunger pump, at the two ends of curved shaft type plunger pump, be provided with power input gear 51, each motor 4 is less than the pitch diameter of power input gear by its pitch diameter of power output gear 41() at least mesh with the power input gear 51 of curved shaft type plunger pump one end. More preferably, the number of the power output gear 41 that the power input gear 51 at curved shaft type plunger pump two ends meshes is identical, can make like this transmission of power at curved shaft type plunger pump two ends distribute more even. More preferably, the power output gear 41 that the power input gear 51 of the arbitrary end of curved shaft type plunger pump meshes is evenly arranged around this power input gear, can make like this transmission of power of the arbitrary end of curved shaft type plunger pump more reliable.

Principle and the technique effect of the fracturing pump transmission system of above-described embodiment are described below in conjunction with concrete scene:

In use, the end of fracturing pump 5 connects flow and manifold system, in the course of the work, a plurality of motors 1 start, drive a plurality of oil pump 2 runnings, a plurality of oil pumps 2 are supplied to a plurality of motors 4 by pressure oil, and a plurality of motors 4 are rotated, a plurality of motors 4 drive fracturing pump 5 to rotate, and the fracturing fluid that fracturing pump 5 is carried is like this by the rear output of flow and manifold system interflow; Compared with prior art, the utility model embodiment is without adopting single high output diesel engine, but adopt a plurality of motors 1, and meeting under the prerequisite of peak output, the power that each motor 1 is born can effectively reduce, thereby, can select common low-powered engine, so greatly improve type selecting scope, correspondingly, each oil pump 2 and each motor 4 type selecting scopes also can effectively improve, and can realize multiple matching way; In addition, adopt after this transmission scheme, each motor 1, each oil pump 2 and each motor 4 are easy to obtain or buy, and without being subject to import, special-purpose restriction, thereby can effectively reduce the component costs of fracturing pump transmission system; In addition, adopt after this kind of drive, if after some motors, oil pump or motor damage, whole transmission system still can guarantee that fracturing work proceeds a period of time, thereby has effectively improved safety redundancy, has reduced the risk that loss occurs construction party; In addition, adopt after this kind of drive, be convenient to by hydraulic control, realize the clockwise and anticlockwise of motor, and then the clockwise and anticlockwise that realizes fracturing pump is (in prior art, be limited to its transmission scheme, fracturing pump can only be followed diesel engine one-way rotation), expanded the function (for example anti-pump washing function) of fracturing unit truck.

It should be noted that, above-described embodiment is in specific implementation process, one of them in a plurality of motors 1 can adopt fracturing unit truck engine in situ, can give full play to the utilization efficiency of engine in situ like this, engine in situ can be played a role in the process of walking, in operation process, also can play a role.

It should be noted that, in above-described embodiment, motor 1 is a plurality of, be convenient to type selecting, control cost and strengthen reliability (safety redundancy), but in other embodiments, motor 1 also can be one, by a plurality of oil pumps 2 of engine-driving (as passed through transfer case) of single relatively high power, this scheme is also convenient to the type selecting of oil pump 2, motor 4 and the reliability that suitably improves transmission system, and the clockwise and anticlockwise of being convenient to realize fracturing pump 5.

Shown in Fig. 3, the utility model is other embodiments also provide a kind of fracturing unit truck, and this fracturing unit truck comprises the fracturing pump transmission system described in chassis 10, fracturing pump 5 and above-described embodiment, and this fracturing pump transmission system is arranged on the car body 11 on chassis 10. From the technique effect of aforementioned fracturing pump transmission system, this fracturing unit truck can effectively reduce manufacture cost and the production difficulty of fracturing unit truck, can effectively improve operating efficiency and maintainability simultaneously.

In specific implementation process, this fracturing unit truck can adopt following preferred arrangement: except a plurality of motor 1 (engines in situ), fracturing pump 5 is installed on the car body 11 on chassis 10 from front to back successively, " front " refers to the driving direction of advance on chassis 10, oil pump 2 can be arranged at a side of corresponding motor 1, and a plurality of motor 4 groupings are arranged in respectively the two ends of fracturing pump 5; Further, hydraulic oil container 3 can be arranged to the first area of a plurality of motors 1 top, for example, this first area can arrange in the position nearer apart from chassis operator cabin; Further, also the cooler bin of fracturing unit truck 12 can be arranged to the second area of a plurality of motors 1 top, for example, this second area can arrange in the position nearer apart from fracturing pump 5, and cooler bin 12 can be for cooling liquid force feed.

Wherein, the specific implementation process of other parts of fracturing unit truck can, referring to the associated description of prior art, hereby not repeat.

The foregoing is only preferred embodiment of the present utility model; not in order to limit the utility model; all within spirit of the present utility model and principle, any modification of doing, be equal to replacement, improvement etc., within all should being included in protection domain of the present utility model.

Cited By (5)

Publication number	Priority date	Publication date	Assignee	Title
CN103742382A *	2013-12-30	2014-04-23	三一重型能源装备有限公司	Fracturing pump transmission system and fracturing truck
CN105134581A *	2015-10-08	2015-12-09	三一重型能源装备有限公司	Fracturing pump and fracturing vehicle
CN105221128A *	2014-06-23	2016-01-06	福伊特专利有限公司	Pump unit
US10982743B2	2016-09-16	2021-04-20	Bosch Rexroth Corporation	Rotary electrohydraulic actuator
WO2023093288A1 *	2021-11-25	2023-06-01	三一石油智能装备有限公司	Hydraulic fracturing pump system and fracturing device
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Similar Documents

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CN103742382A	2014-04-23	Fracturing pump transmission system and fracturing truck
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CN204099301U	2015-01-14	Hydraulic system and fracturing unit truck
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CN202560199U	2012-11-28	Fracturing truck used for oilfield or coal-bed gas exploitation
CN2710953Y	2005-07-20	Gearing mechanism of compacting machinery

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
CN201320882382.6U	2013-12-30	2013-12-30	Fracturing pump transmission system and fracturing truck

Applications Claiming Priority (1)

Application	Filing date	Title
CN201320882382.6U	2013-12-30	Fracturing pump transmission system and fracturing truck

Legal Events

Date	Code	Title	Description
2014-08-20	C14	Grant of patent or utility model	
2014-08-20	GR01	Patent grant	
2017-03-15	C41	Transfer of patent application or patent right or utility model	
2017-03-15	TR01	Transfer of patent right	Effective date of registration: 20170220 Address after: 102206 South Beijing city of Changping District science and Technology Park 31 manufacturing center of Beijing Liu Lu Li Patentee after: SANY PETROLEUM INTELLIGENT EQUIPMENT Co.,Ltd. Address before: 102206 Changping District City, North Road, Beijing, the 31 Industrial Park Patentee before: SANY HEAVY ENERGY EQUIPMENT Co.,Ltd.
2024-01-16	CX01	Expiry of patent term	Granted publication date: 20140820
2024-01-16	CX01	Expiry of patent term	

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■ hydraulic oil	claims,description	13	0.000		
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