

Hydraulic transmission system for fracturing truck and fracturing truck

Abstract

The invention discloses a hydraulic transmission system for a fracturing truck and the fracturing truck. The hydraulic transmission system comprises an engine unit, a hydraulic transmission oil path, a fracturing executing mechanism and a hydraulic oil tank. The engine unit comprises at least one engine. The engines are in drive connection with at least one set of hydraulic drive unit. Each hydraulic drive unit comprises an oil pump and a gear pump. The hydraulic transmission oil path comprises a first oil path, a second oil path and a third oil path. The fracturing executing mechanism is provided with a plurality of hydraulic drivers. A closed oil path is formed by the oil pumps, the first oil path, the hydraulic drivers and the second oil path. Air cooling motors are arranged between the second oil path and the third oil path. The input ends of the gear pumps are communicated with the hydraulic oil tank, and the output ends of the gear pumps are collected through the third oil path and then communicated with the second oil path through the air cooling motors. The hydraulic transmission system has the beneficial effects that the oil supply capability is large, the drive capacity is high, the highest output pressure is high, and the maximum output delivery is large; and hydraulic pipelines are simple and easier to arrange, the weight is low, the size is small, using is flexible and convenient, and the oil tank is small in size.

Classifications

 **F16H39/02** Rotary fluid gearing using pumps and motors of the volumetric type, i.e. passing a predetermined volume of fluid per revolution with liquid motors at a distance from liquid pumps

View 1 more classifications

Landscapes

- Engineering & Computer Science
- General Engineering & Computer Science
- Show more

CN105090423A

China

Download PDF

Find Prior Art

Similar

Other languages: [Chinese](#)

Inventor: [杨鑫, 赵真, 谭良华](#)

Current Assignee : [Sany Petroleum Intelligent Equipment Co Ltd](#)

Worldwide applications

2015 [CN](#)

Application CN201510567518.8A events 

2015-09-08

Application filed by Sany Heavy Energy Equipment Co Ltd

2015-09-08

Priority to CN201510567518.8A

2015-11-25

Publication of CN105090423A

2018-01-02

Application granted

2018-01-02

Publication of CN105090423B

Status

Active

2035-09-08

Anticipated expiration

Info: [Patent citations \(5\)](#), [Non-patent citations \(1\)](#), [Cited by \(2\)](#), [Legal events](#), [Similar documents](#), [Priority and Related Applications](#)

External links: [Espacenet](#), [Global Dossier](#), [Discuss](#)

Claims (10)

Hide Dependent ^

1. the Hydraulic Power Transmission System for fracturing unit truck, it is characterized in that: comprise engine unit (1), hydraulic transmission oil circuit (2), pressure break actuator (3) and hydraulic oil container (4), described engine unit (1) comprises at least one motor (11), motor (11) drives and is connected with at least one group of hydraulic drive unit (12), described hydraulic drive unit (12) comprises oil pump (121) and gear pump (122), described hydraulic transmission oil circuit (2) comprises the first oil circuit (21), second oil circuit (22) and the 3rd oil circuit (23), described pressure break actuator (3) is provided with the multiple stage hydraulic unit driver (31) for driving pressure break actuator (3), described oil pump (121), first oil circuit (21), hydraulic unit driver (31), second oil circuit (22) four forms closed loop oil circuit, at least one is also provided with for the air-cooled motor (13) that dispels the heat of engine unit (1) between described second oil circuit (22) and the 3rd oil circuit (23), the input end of described gear pump (122) is communicated with hydraulic oil container (4), output terminal is communicated with the second oil circuit (22) respectively through air-cooled motor (13) after being collected by the 3rd oil circuit (23) again.
2. the Hydraulic Power Transmission System for fracturing unit truck according to claim 1, is characterized in that: described oil pump (121) is enclosed oil pump.
3. the Hydraulic Power Transmission System for fracturing unit truck according to claim 2, is characterized in that: described enclosed oil pump is enclosed plunger pump.
4. the Hydraulic Power Transmission System for fracturing unit truck according to claim 3, is characterized in that: described air-cooled motor (13) is identical with the quantity of motor (11).
5. the Hydraulic Power Transmission System for fracturing unit truck according to claim 4, is characterized in that: described air-cooled motor (13) mounting arrangements is in the top of motor (11).
6. the Hydraulic Power Transmission System for fracturing unit truck according to claim 5, is characterized in that: described hydraulic unit driver (31) is oil cylinder or oil hydraulic motor.
7. the Hydraulic Power Transmission System for fracturing unit truck according to claim 6, is characterized in that: described pressure break actuator (3) is plunger case.
8. the Hydraulic Power Transmission System for fracturing unit truck according to claim 7, is characterized in that: described pressure break actuator (3) is fracturing pump.
9. the Hydraulic Power Transmission System for fracturing unit truck according to claim 8, it is characterized in that: the two ends of described fracturing pump are equipped with dunnage (32), the gearwheel (33) for driving fracturing pump is provided with in the inner side of dunnage (32), described multiple stage hydraulic unit

driver (31) is individually fixed in the dunnage (32) at fracturing pump two ends, the output shaft of described hydraulic unit driver (31) is provided with small gear (311), the small gear (311) of the upper each hydraulic unit driver (31) of arbitrary described dunnage (32) engages with the gearwheel (33) of this dunnage (32) inner side jointly.

10. a fracturing unit truck, comprises chassis (5), it is characterized in that: described chassis (5) are provided with the Hydraulic Power Transmission System for fracturing unit truck described in any one in claim 1 ~ 9.

Description

A kind of Hydraulic Power Transmission System for fracturing unit truck and fracturing unit truck

Technical field

The present invention relates to engineering machinery field, be specifically related to a kind of Hydraulic Power Transmission System for fracturing unit truck and fracturing unit truck.

Background technique

Pressure break is the important technical that oil gas field increasing the storage is produced, and needs first to be pressed off by formation fracture by high-pressure liquid, then toward filling fracturing sand in crack, strengthens in-place permeability, improves oil and gas production. Tradition fracturing unit truck its pressure break actuator car all adopts the transmission scheme of " diesel engine-fluid torque converter-transmission shaft-pressure break actuator ", and this arrangement is the power scheme of prime mover based on motor. The subject matter existed is: 1, drive path can only be " diesel engine-fluid torque converter-transmission shaft-pressure break actuator ", can not split; 2, this kind of transmission scheme determines can only select to meet peak output motor, when unit rises rapidly more than cost during 1500KW, and type selecting difficulty; The Component selection narrow range such as 3, supporting torque-converters, price is high, and critical elements (torque-converters, transfer case, pressure break actuator etc.) all needs import, causes complete machine with high costs not to the utmost, and development is subject to the restriction of import parts cycle and the source of goods. In addition, on the basis of said structure, also have and use diesel engine and pressure break actuator instead hydraulic transmission and instead of mechanical drive mode, pressure break actuator is driven by hydraulic oil, but the shortcoming that this mode exists is that control valve group is many, quality is large, hydraulic pipe line is arranged difficult, and the pressure break actuator of the Hydraulic Power Transmission System of existing fracturing unit truck is open type pump, open type pump rated working pressure is lower relative to enclosed pump, cause whole large pump delivery pressure on the low side, open type pump rated speed is low relative to enclosed pump, equal number and discharge capacity open type POF lower, cause large pump displacement lower.

Summary of the invention

The technical problem to be solved in the present invention is to provide that a kind of supply capability is large, driving force is strong, export maximum pressure high, export that maximum pump discharge is large, hydraulic pipe line simply and more easily arrange, quality is light, volume is little, flexible and convenient to use, fuel tank volume the is little Hydraulic Power Transmission System for fracturing unit truck and fracturing unit truck.

For solving the problems of the technologies described above, the technical solution used in the present invention is:

The invention provides a kind of Hydraulic Power Transmission System for fracturing unit truck, comprise engine unit, hydraulic transmission oil circuit, pressure break actuator and hydraulic oil container, described engine unit comprises at least one motor, engine-driving is connected with at least one group of hydraulic drive unit, described hydraulic drive unit comprises oil pump and gear pump, described hydraulic transmission oil circuit comprises the first oil circuit, second oil circuit and the 3rd oil circuit, described pressure break actuator is provided with the multiple stage hydraulic unit driver for driving pressure break actuator, described oil pump, first oil circuit, hydraulic unit driver, second oil circuit forms closed loop oil circuit, at least one air-cooled motor for dispelling the heat to engine unit is also provided with between described second oil circuit and the 3rd oil circuit, the input end of described gear pump is communicated with hydraulic oil container, output terminal is communicated with the second oil circuit respectively through air-cooled motor after being collected by the 3rd oil circuit again.

Preferably, described oil pump is enclosed oil pump.

Preferably, described enclosed oil pump is enclosed plunger pump.

Preferably, described air-cooled motor is identical with the quantity of motor.

Preferably, described air-cooled motor mounting arrangements is in the top of motor.

Preferably, described hydraulic unit driver is oil cylinder or oil hydraulic motor.

Preferably, described pressure break actuator is plunger case.

Preferably, described pressure break actuator is fracturing pump.

Preferably, the two ends of described fracturing pump are equipped with dunnage, the gearwheel for driving fracturing pump is provided with in the inner side of dunnage, described multiple stage hydraulic unit driver is individually fixed in the dunnage at fracturing pump two ends, the output shaft of described hydraulic unit driver is provided with small gear, and in arbitrary described dunnage, the small gear of each hydraulic unit driver engages with the gearwheel inside this dunnage jointly.

The present invention also provides a kind of fracturing unit truck, comprises chassis, and chassis is provided with the aforementioned Hydraulic Power Transmission System for fracturing unit truck.

The Hydraulic Power Transmission System that the present invention is used for fracturing unit truck has following advantage:

1, engine unit of the present invention comprises at least one motor, each engine-driving is connected with at least one group of hydraulic drive unit, pressure break actuator is provided with the multiple stage hydraulic unit driver for driving pressure break actuator, oil pump, the first oil circuit, hydraulic unit driver, the second oil circuit form closed loop oil circuit, therefore, it is possible to adopt the motor of greater number, the hydraulic drive unit of each motor employing greater number as required, have that supply capability is large, driving force be strong, export maximum pressure high, export the large advantage of maximum pump discharge.

2, hydraulic transmission oil circuit of the present invention comprises the first oil circuit, the second oil circuit and the 3rd oil circuit, the oil circuit that the hydraulic driving part such as hydraulic drive unit, hydraulic unit driver realizes Hydraulic Power Transmission System based on above-mentioned trunk oil circuit is communicated with, therefore, it is possible to realize optimizing hydraulic pipe line support, pipe clamp etc. to optimize complete vehicle quality, to beautify the object of car load outward appearance, there is hydraulic pipe line simply and more easily layout, quality is light, volume is little advantage.

3, between the second oil circuit of the present invention and the 3rd oil circuit, the clothes made of brocade is provided with at least one air-cooled motor for dispelling the heat to engine unit, utilizes the repairing of air cooling system oil return oil feed pump, thus can simplify the repairing mode of closed loop oil circuit.

4, oil pump of the present invention is enclosed oil pump further, can reduce inlet line latus rectum, reduces fuel tank volume.

Accompanying drawing explanation

The accompanying drawing forming a part of the present invention is used to provide a further understanding of the present invention, and schematic description and description of the present invention, for explaining the present invention, does not form inappropriate limitation of the present invention.In the accompanying drawings:

Fig. 1 is the theory structure schematic diagram of embodiment of the present invention Hydraulic Power Transmission System.

Fig. 2 is the side-looking structural representation of embodiment of the present invention fracturing unit truck.

Fig. 3 is the perspective view of embodiment of the present invention pressure break actuator.

Marginal data: 1, engine unit; 11, motor; 12, hydraulic drive unit; 121, oil pump; 122, gear pump; 13, air-cooled motor; 2, hydraulic transmission oil circuit; 21, the first oil circuit; 22, the second oil circuit; 23, the 3rd oil circuit; 3, pressure break actuator; 31, hydraulic unit driver; 311, small gear; 32, dunnage; 33, gearwheel; 4, hydraulic oil container; 5, chassis.

Embodiment

It should be noted that, when not conflicting, the embodiment in the present invention and the feature in embodiment can combine mutually.Below with reference to the accompanying drawings and describe the present invention in detail in conjunction with the embodiments.

As shown in Figure 1, the Hydraulic Power Transmission System that the present embodiment is used for fracturing unit truck comprises engine unit 1, hydraulic transmission oil circuit 2, pressure break actuator 3 and hydraulic oil container 4, engine unit 1 comprises five motors 11, motor 11 drives and is connected with many group hydraulic drive unit 12, hydraulic drive unit 12 comprises oil pump 121 and gear pump 122, hydraulic transmission oil circuit 2 comprises the first oil circuit 21, second oil circuit 22 and the 3rd oil circuit 23, pressure break actuator 3 is provided with ten hydraulic unit drivers 31 for driving pressure break actuator 3, oil pump 121, first oil circuit 21, hydraulic unit driver 31, second oil circuit 22 4 forms closed loop oil circuit, also be provided with between second oil circuit 22 and the 3rd oil circuit 23 at least one for give engine unit 1 dispel the heat air-cooled motor 13, the input end of gear pump 122 is communicated with hydraulic oil container 4, output terminal is communicated with the second oil circuit 22 respectively through air-cooled motor 13 after being collected by the 3rd oil circuit 23 again.Certainly, engine unit 1 comprises the quantity of motor 11, the quantity of each motor 11 driving connection hydraulic drive unit 12 all can carry out selecting its quantity according to the power of motor 11 and hydraulic drive unit 12, such as be chosen as one, two or more, under the prerequisite that power is identical, the quantity selected is more, then its supply capability is larger, driving force is stronger, and the maximum pressure of output maximum pump discharge that is higher, that export is larger; In like manner, for driving the hydraulic unit driver 31 of pressure break actuator 3 can select other quantity as required, do not repeat them here yet.

The present embodiment utilizes the repairing of air cooling system oil return oil feed pump 121, can simplify the repairing mode of closed loop oil circuit.

In the present embodiment, oil pump 121 is enclosed oil pump, can reduce inlet line latus rectum, reduces fuel tank volume.In the present embodiment, enclosed oil pump is enclosed plunger pump.

As shown in Figure 1, in the present embodiment, hydraulic unit driver 31 is oil hydraulic motor, and hydraulic unit driver 31 also can adopt oil cylinder in addition; In the present embodiment, pressure break actuator 3 is fracturing pump, and pressure break actuator 3 also can adopt plunger case in addition.

As shown in Figure 2, the fracturing unit truck of application the present embodiment comprises chassis 5, and chassis 5 is provided with the aforesaid Hydraulic Power Transmission System of the present embodiment.

As shown in Figure 2, air-cooled motor 13 identical with the quantity of motor 11 (being five in the present embodiment), and air-cooled motor 13 mounting arrangements is in the top of motor 11.

As shown in Figure 3, the two ends of fracturing pump are equipped with dunnage 32, the gearwheel 33 for driving fracturing pump is provided with in the inner side of dunnage 32, multiple stage hydraulic unit driver 31 is individually fixed in the dunnage 32 at fracturing pump two ends, the output shaft of hydraulic unit driver 31 is provided with small gear 311, and in arbitrary dunnage 32, the small gear 311 of each hydraulic unit driver 31 engages with the gearwheel 33 inside this dunnage 32 jointly.

The working procedure that the present embodiment is used for the Hydraulic Power Transmission System of fracturing unit truck is as follows: drive each hydraulic unit driver 31 through the first oil circuit 21 behind each fuel-displaced interflow of oil pump 121, each hydraulic unit driver 31 makes a concerted effort to drive pressure break actuator 3, gets back to oil pump 121 inlet port behind the fuel-displaced interflow of then each hydraulic unit driver 31 through the second oil circuit 22; Simultaneously, air-cooled motor 13 is driven through the 3rd oil circuit 23 behind each fuel-displaced interflow of gear pump 122, collaborate with the second oil circuit 22 behind the air-cooled fuel-displaced interflow of motor 13, as the repairing of oil pump 121, thus achieve the persistent loop of the closed loop oil circuit formed between oil pump 121, first oil circuit 21, hydraulic unit driver 31, second oil circuit 22 4.

The foregoing is only preferred embodiment of the present invention, not in order to limit the present invention, within the spirit and principles in the present invention all, any amendment done, equivalent replacement, improvement etc., all should be included within protection scope of the present invention.

Patent Citations (5)

Publication number	Priority date	Publication date	Assignee	Title
CN202935216U *	2012-04-01	2013-05-15	辽宁华孚石油高科技股份有限公司	Fracturing pump vehicle driven by turbine engine
US20130306322A1 *	2012-05-21	2013-11-21	General Electric Company	System and process for extracting oil and gas by hydraulic fracturing
CN103410494A *	2013-08-16	2013-11-27	湖北中油科昊机械制造有限公司	Acidification fracturing truck
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

CN205026040U *	2015-09-08	2016-02-10	三一重型能源装备有限公司	A hydraulic transmission system and fracturing unit truck for fracturing unit truck
Family To Family Citations				

* Cited by examiner, † Cited by third party

Non-Patent Citations (1)

Title
张志强等: "全液压压裂车液压系统及作业能力分析", 《机械研究与应用》 *

* Cited by examiner, † Cited by third party

Cited By (2)

Publication number	Priority date	Publication date	Assignee	Title
CN107544304A *	2017-09-01	2018-01-05	三石油智能装备有限公司	Fracturing unit truck control method and device
CN114151055A *	2021-11-16	2022-03-08	三一石油智能装备有限公司	Fracturing equipment hydraulic system, control method and fracturing equipment
Family To Family Citations				

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
CN204552723U	2015-08-12	A kind of pressure break transmission and high pressure discharge system
CN107816341B	2019-09-24	A kind of hydraulic-driven Modular pump pressure break sledge
CN204099301U	2015-01-14	Hydraulic system and fracturing unit truck
US10280725B2	2019-05-07	Hydraulic double-acting fracturing pump skid
DE102008028547A1	2009-12-31	Hydraulic output shaft generator
CN105121902B	2018-08-31	Hydrostatic and directly drive transmission device
CN101934728B	2012-11-21	Static hydraulic transmission case
CN203783839U	2014-08-20	Fracturing pump transmission system and fracturing truck
CN105090423A	2015-11-25	Hydraulic transmission system for fracturing truck and fracturing truck
CN103742382B	2018-07-13	Fracturing pump transmission system and fracturing unit truck
CN205026040U	2016-02-10	A hydraulic transmission system and fracturing unit truck for fracturing unit truck
CN105041603B	2017-09-19	A kind of fracturing unit truck and its transmission induction system
CN103660928A	2014-03-26	Autonomous-heat-exchange parallel-connection closed type forklift static-pressure drive system
CN204900181U	2015-12-23	Motor fracturing pump
CN202347856U	2012-07-25	Dual pump converging power device for vehicle-mounted concrete pump
CN205036830U	2016-02-17	Rearmounted transfer case of multi -functional coaxial bull output
CN204900187U	2015-12-23	Fracturing unit truck and transmission conveying system thereof
CN204899897U	2015-12-23	Double dynamical fracturing unit truck
CN201963620U	2011-09-07	Power drive unit of concrete pumping equipment and concrete pumping equipment
CN204687842U	2015-10-07	Wheel tyre walking hydraulic pressure auxiliary drive
US8621859B2	2014-01-07	Hydraulic system
CN205036799U	2016-02-17	Three multi -functional rearmounted transfer cases of output
CN203161688U	2013-08-28	Hydraulic system for mixer truck and mixer truck with hydraulic system

CN201679664U	2010-12-22	Pump body
CN201953943U	2011-08-31	Two-way transmission speed-changing device

Priority And Related Applications

Priority Applications (1) ▲

Application	Priority date	Filing date	Title
CN201510567518.8A	2015-09-08	2015-09-08	A kind of Hydraulic Power Transmission System and fracturing unit truck for fracturing unit truck

Applications Claiming Priority (1) ▲

Application	Filing date	Title
CN201510567518.8A	2015-09-08	A kind of Hydraulic Power Transmission System and fracturing unit truck for fracturing unit truck

Legal Events ▲

Date	Code	Title	Description
2015-11-25	C06	Publication	
2015-11-25	PB01	Publication	
2015-12-23	C10	Entry into substantive examination	
2015-12-23	SE01	Entry into force of request for substantive examination	
2017-01-18	C41	Transfer of patent application or patent right or utility model	
2017-01-18	TA01	Transfer of patent application right	Effective date of registration: 20161230 Address after: 102206 South Beijing city of Changping District science and Technology Park 31 manufacturing center of Beijing Liu Lu Li Applicant after: 31 petroleum Intelligent Equipment Co., Ltd. Address before: 102206 Changping District City, North Road, Beijing, the 31 Industrial Park Applicant before: SANY HEAVY ENERGY EQUIPMENT CO., LTD.
2018-01-02	GR01	Patent grant	
2018-01-02	GR01	Patent grant	