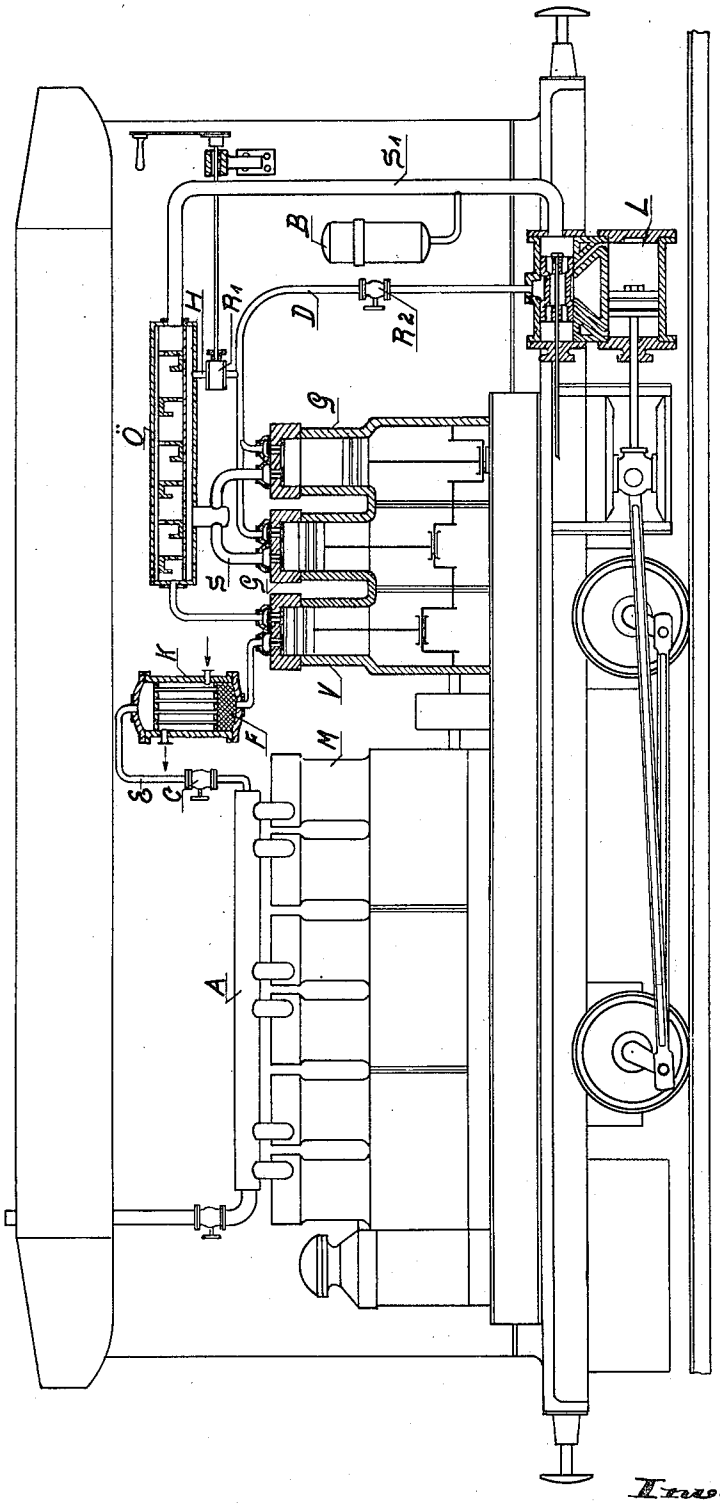
May 27 , 1924. 1,495,567

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APPARATUS FOR TRANSMITTING POWER

Filed Jan. 25 , 1924



Inventor:
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By Marks & Clerk Attys.

Patented May 27, 1924. 1,495,567

UNITED STATES PATENT OFFICE.

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APPARATUS FOR TRANSMITTING POWER.

Application filed January 25, 1924. Serial No. 688,627.

To all whom it may concern:

Be it known that I, ERICH BAENTSCH, a citizen of the German Republic, residing at No. 13 Konsul-strasse, Gorlitz, Silesia, Germany, have invented certain new and useful Improvements in Apparatus for Transmitting Power (for which I have filed an application in Germany December 22, 1922), of which the following is a specification.

In the transmission of power from an internal combustion engine by means of compressed gas circulating between a compressor driven by the said engine and an expansion motor it is impossible, notwithstanding the interposition of oil separators, to prevent the percentage of oil contained in the circulating gas from gradually increasing to such a degree that the oil is liable to become ignited if there should be any free oxygen in the circulating gas. That risk is more particularly existent with compressed air which has hitherto been exclusively employed as the circulating compressed gas.

The present invention has for its object to prevent the possibility of an ignition of oil, even during long continued working, and in accordance therewith there is employed as the compressed gas a gas or gaseous mixture which is free from free or uncombined oxygen, or contains only such small amounts of free or uncombined oxygen, that the ignition of oil is excluded at the ordinary temperatures and pressures employed in the art.

Gases which are free from free or uncombined oxygen are mainly:—carbonic acid gas and sulphurous acid gas. When using air, the percentage of the contained free or uncombined oxygen can be reduced sufficiently by an admixture of these gases or of water vapour. The simplest and cheapest manner of working is the use of the exhaust gases of the internal combustion engine which, as is known, contain about one-fifth of the quantity of free or uncombined oxygen contained in atmospheric air. These exhaust gases are continuously produced in the working of the engine and therefore do not entail any extra expense. If required, they can be purified and cooled to a sufficient degree by simple means.

An improved apparatus for carrying the improved process into effect with the exhaust gases of an internal combustion engine is illustrated diagrammatically in the accompanying drawing in which:—

M is an internal combustion engine; L is an expansion motor cylinder; and G is a compressor for compressing the circulating gaseous motive medium. A delivery pipe D leads from the compressor G to the slide valve chest of the expansion motor cylinder L, the exhaust pipe of which is connected by a suction pipe S^1 on one hand to an oil separator O and on the other hand to an equalizing vessel B. A suction pipe S leads from the oil separator O back to the compressor G, and thereby completes the cycle.

The introduction of the exhaust gases of the internal combustion engine M into this cycle is effected by means of a pipe E which is connected to the exhaust manifold A and in which there are provided a cooler K, a filter or purifier F and a preliminary compressor V. This pipe E delivers likewise into the oil separator O. The preliminary compressor V has the duty of raising the exhaust gases to a pressure equal to the back pressure of the expansion motor. In the pipe E there may be inserted a regulating valve C for the purpose of enabling the whole or only a part of exhaust gases to be introduced into the cycle according to requirement.

For the purpose of stopping the expansion motor without interrupting the running of the internal combustion engine and the compressor G, there is provided according to this invention a by-pass pipe H which opens into the cycle, and delivers on the one hand into the oil separator, and on the other hand into the delivery pipe D in front of the expansion motor L. The flow through this by-pass pipe can be regulated to a greater or lesser extent by means of a regulating valve R^1 inserted in it, so that the power of the expansion motor can be regulated also within wide limits by means of this by-pass pipe.

Further, by means of the by-pass pipe H a high pressure can be generated in the delivery pipe D for the purpose of starting the expansion motor L quickly by the provision of a regulating valve R^2 between the point where the by-pass pipe H opens into the delivery pipe D and the expansion motor. Then, before starting, the valve R^1 is opened, whilst the valve R^2 is still closed,

and the latter valve is opened after having previously closed the valve R^1 when the desired high starting pressure has been attained. By suitably adjusting the valves R^1 and R^2 relatively to each other, the power of the expansion motor can be regulated within wide limits.

What I claim is:—

1. An apparatus for transmitting the output of an internal combustion engine by means of compressed gas circulating between a compressor driven by said engine and an expansion motor, characterized by the utilization of the exhaust gases of the internal combustion engine as the circulating compressed gas, and a preliminary compressor connected with the internal combustion engine for compressing the exhaust gases to a pressure equal to the back pressure of the expansion motor.

2. In an apparatus of the character described, an internal combustion engine, a compressor driven by said engine, an expansion motor receiving its working fluid from said compressor, suction and delivery pipes connecting the compressor and expansion motor, an oil separator located in the suction pipe, a pipe connecting said oil separator to the exhaust of the internal combustion engine, a by-pass pipe connecting said oil separator to the delivery pipe of said compressor at a point located in front of said expansion motor, and means for regulating the flow through said by-pass pipe.

3. In an apparatus of the character described, an internal combustion engine, a compressor driven by said engine, an expansion motor receiving its working fluid from said compressor, suction and delivery pipes connecting the compressor and expansion motor, an oil separator located in the suction pipe, a pipe connecting said oil separator to the exhaust of the internal combustion engine, a by-pass pipe connecting said oil separator to the delivery pipe of said compressor at a point located in front of said expansion motor, means for regulating the flow through said by-pass pipe, and a regulating valve in the delivery pipe located between the expansion motor and the point of connection of the by-pass pipe with said delivery pipe.

4. An apparatus as claimed in claim 2 characterized by the provision of a cooler and purifier in the pipe connecting the oil separator to the exhaust of the internal combustion engine, and a regulating valve in the last mentioned pipe located in front of the cooler and purifier.

5. An apparatus as claimed in claim 2 characterized by the provision of a compressor connected with the pipe connecting the oil separator to the exhaust of the internal combustion engine for compressing the exhaust gases to a pressure equal to the back pressure of the expansion motor.

6. An apparatus as claimed in claim 2 characterized by the provision of an equalizing vessel connected with the suction pipe.

In testimony whereof I have signed my name to this specification.

ERICH BAENTSCH.