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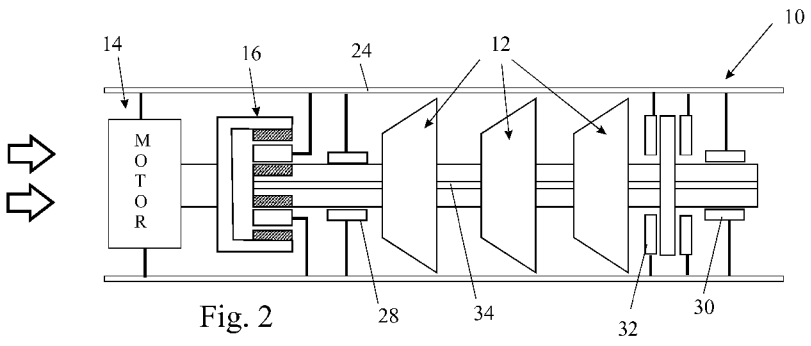

Fig. 2

(57) Abstract: A magnetic change speed gearbox 16 is described for use in a downhole assemblies having a higher speed shaft supported by a gas bearing. The downhole assembly may be one comprising a motor 14 driving a compressor 12 by way of a step-up magnetic gearbox 16 or one comprising a gas turbine driving a pump by way of a step-down magnetic gearbox.

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AMENDED CLAIMS
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1. A magnetic change speed gearbox for connection between an electric motor and a gas compressor, the magnetic change speed gearbox having a higher speed output shaft supported by a gas bearing, said output shaft being for connection to the gas compressor.

2. A magnetic change speed gearbox as claimed in claim 1, wherein a lower speed input shaft of the gearbox is liquid lubricated.

3. A magnetic change speed gearbox as claimed in claim 1 or 2, wherein input and output shafts of the magnetic gearbox are magnetically connected to one another by way of two rings carrying permanent magnets and an intermediate ring carrying non-magnetised pole pieces in such a manner that the input and output shafts rotate with a fixed speed ratio.

4. A magnetic change speed gearbox as claimed in any preceding claim, being for lowering into a gas well.

5. An assembly for lowering into a gas well, comprising an electric motor connected to a gas compressor by way of a change speed magnetic gearbox, the magnetic change speed gearbox having a higher speed output shaft supported by a gas bearing, said output shaft being connected to the gas compressor.

6. An assembly as claimed in claim 5 wherein the gas bearing forms part of the magnetic gearbox.

7. An assembly as claimed in claim 5 wherein the gas bearing forms part of the compressor.

8. An assembly as claimed in any one of claims 5 to 7, wherein the speed of the electric motor is controlled by a controller located in use remotely from the motor above ground level and connected to the motor by a transmission line.

9. An assembly as claimed in any of claims 5 to 8, wherein a bore is provided in a rotor of the compressor to connect a high pressure side of the compressor to the interior of the magnetic gearbox.

10. An assembly as claimed in any one of claims 5 to 8, wherein the higher speed output shaft of the magnetic gearbox is connected to a rotor shaft of the gas compressor by means of a quill shaft, and wherein the higher speed output shaft of the magnetic gearbox is supported on two gas bearings, one of which is supported by an intermediate ring of the magnetic gearbox assembly carrying stationary pole pieces.

11. An assembly for lowering into an oil well in which transportation of oil to the surface is assisted by feeding a compressed gas down the well, comprising a gas expansion turbine powered by the compressed gas and a pump driven by the gas turbine for increasing the oil pressure in the well, wherein the gas turbine is connected to the pump by a magnetic gearbox of which the input shaft connected to the gas turbine is supported by a gas bearing.

12. An assembly as claimed in claim 11, wherein the

gas bearing forms part of the magnetic gearbox.

13. An assembly as claimed in claim 11 wherein one gas bearing assembly is within the envelope of the magnetic gearbox.

14. An assembly as claimed in claim 11, wherein the gas bearing forms part of the gas turbine.

15. An assembly as claimed in any of claims 11 to 14, wherein a bore is provided in the rotor of the gas turbine to connect the high pressure side of the gas turbine to the interior of the magnetic gearbox.