(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 092 279**
**A2**

# (12) EUROPEAN PATENT APPLICATION

(21) Application number: **83200529.2**

(51) Int. Cl.³: **B 66 D 1/44**

(22) Date of filing: **13.04.83**

(30) Priority: **20.04.82 NL 8201638**

(43) Date of publication of application: **26.10.83**
**Bulletin 83/43**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**

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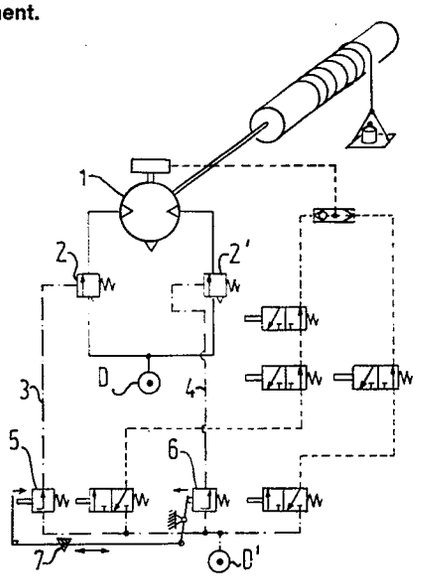
## (54) Pneumatically controlled air motor, for example, for hoisting implement.

(57) A pneumatically driven, reversible motor (1), for example, for a hoisting implement, comprising ports connected with two supply ducts for the forward and return run respectively, the feed being controlled by means of a pneumatic control-circuit, wherein at least one feed duct includes a proportionally operating reducing valve (2), which is controlled by means of a control-duct (3) with a manually actuated, proportionally operating reducing valve (5, 6, 5′) raising the pressure to the pneumatic motor (1) such that the moment produced by the load can just not be retained by the motor (1), where upon the motor will rotate with low speed in the opposite sense, said low speed being controlled by the extent of opening of the reducing valve.

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# Pneumatically controlled air motor, for example, for hoisting implement

The invention relates to a pneumatically driven, reversible motor, for example, for a hoisting implement, comprising ports connected with two supply ducts for the forward and return run respectively, the feed being controlled by means of a pneumatic control-circuit.

The invention has for its object to provide a motor with an improved pneumatic control so that the pneumatic motor is capable of rotating with variable speeds in one sense as well as in the other in both the loaded state and the no-load state.

The motor embodying the invention is distinguished in that at least one feed duct includes a proportionally operating reducing valve, which is controlled by means of a control-duct with a manually actuated, proportionally operating reducing valve.

By means of such a proportionally acting reducing valve the pressure to the pneumatic motor can be raised in a manner such that the moment produced by the load can just not be retained by the motor. As a result the motor will rotate with low speed in the opposite sense, the speed being controlled by the extent of opening of the reducing valve. The latter effect is determined by the extent of depression of the manually actuated, proportionally operating reducing valve.

In a particularly simple embodiment the two feed ducts to the pneumatic motor include a proportionally operating reducing valve, each having its own control-circuit.

In an embodiment in accordance with a further development of the invention a by-pass ducts is arranged parallel to one feed duct, in which the by-pass duct and the

other feed duct can be alternately connected and set free respectively with the source of pressure by means of a five-port control-valve and in which said one feed duct or the by-pass duct can be connected with the motor by means of a three-port valve.

The invention will be described more fully with reference to two embodiments.

The drawing shows in:

Fig. 1 a first embodiment of a pneumatic control-diagram for a reversible, pneumatic motor.

Fig. 2 a second embodiment of a pneumatic control-diagram.

In both figures corresponding parts are designated by the same reference numerals. reference numeral 1 designates the reversible pneumatic motor with the ports of which are individually connected feed ducts communicating with a source of pressure D.

Referring to fig. 1, each feed duct is provided with a proportionally operating reducing valve 2 and 2', which valves can be actuated by their own control-circuits 3 and 4. The control-circuit 3 includes a manually actuated, proportionally operating reducing valve 5 and 6 respectively.

By depressing, for example, valve 5 the valve 2 will open further at an increasing pressure in the duct 3 so that an increasing pressure will act on the motor. As a result the motor will turn to the right, for example. By depressing the valve 6, the pressure in the duct 4 increases so that the counter-pressure on the motor also increases. by correctly balancing the two pressures on both sides of the motor the speed of the motor is controlled in one sense or the other. It is thus possible to cause the motor to hoist and the veer at full speed or at lower speeds. It is preferred to simultaneously depress or release respectively the valves 5, 6 by means of a mechanical leverage 7. The pneumatic control-circuit part for the brake of the motor included in the diagram is of a conventional type and is left out of consideration.

Fig. 2 shows an embodiment in which the two

feed ducts of the motor 1 are connected with the source of pressure D; only one feed duct 8 is provided with a proportionally operating reducing valve 2. Parallel to the duct 8 is arranged a by-pass duct 9, which can be connected together with the other feed duct with the source of pressure by means of a five-port valve 11. This five-port valve 11 can be moved by means of a control-circuit 12 into the left-hand or right-hand position respectively so that the motor 1 can be alternately rotated to the left or to the right. The control-circuit system 12 os of a conventional type and lies beyond the scope of this invention.

The proportionally operating reducing valve 2 in the feed duct 8 is controlled in the same manner as indicated in the foregoing diagram by means of a manually actuated reducing valve 5' so that with an increasing pressure in the control-duct 3 the valve 2 will further open. The duct 8 is connected with the motor 1 by means of a three-port valve 12, which is controlled by a three-port valve 13, which in turn is controlled by the control-duct 3. As soon as pressure prevails in the duct 3 the control-duct to valve 12 is energized so that the feed duct 8 adjoins the motor 1.

Assuming the left-hand port of the motor 1 in fig. 2 serves for hoisting a load, a lower pressure in the feed duct in the left-hand port will result in a reversal of the direction or rotation of the motor at a given load. The counter-pressure braking effect aimed at by the invention is thus obtained so that the load will be lowered more or less rapidly in accordance with the depression of the manually actuated valve 5'.

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WHAT IS CLAIMED IS:

1. A pneumatically driven, reversible motor, for example, for a hoisting implement, comprising ports connected with two feed ducts for the forward and return run respectively, the feed being controlled by means of a pneumatic control-circuit characterized in that at least one feed duct includes a proportionally operating reducing valve which is controlled by means of a control-duct by a manually actuated, proportionally operating reducing valve.

2. A motor as claimed in claim 1, characterized in that the two feed ducts include each a proportionally operating reducing valve, each having its won control-circuit.

3. A motor as claimed in claim 2, characterized in that parallel to one feed duct is arranged a by-pass duct and in that the by-pass duct together with the other feed duct can be alternately connected with the source of pressure and set free by means of a five-port control-valve and said one feed duct pr the by-pass duct can be connected with the motor by means of a three-port valve.

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FIG.1

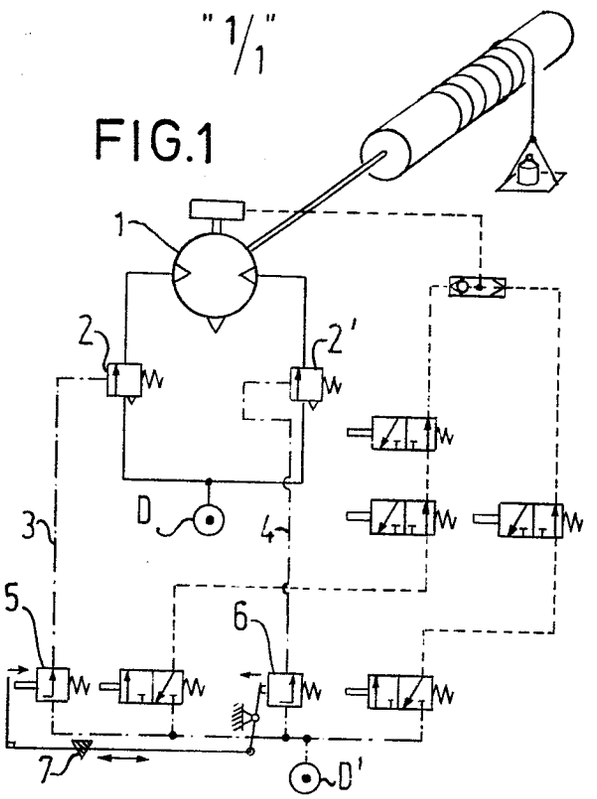


FIG.2