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(11) Publication number:

0 147 063
A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 84308173.8

(51) Int. Cl.⁴: **F 04 B 49/02**
F 04 B 35/00

(22) Date of filing: 26.11.84

(30) Priority: 29.11.83 GB 8331867

(43) Date of publication of application:
03.07.85 Bulletin 85/27

(84) Designated Contracting States:
BE DE FR IT NL SE

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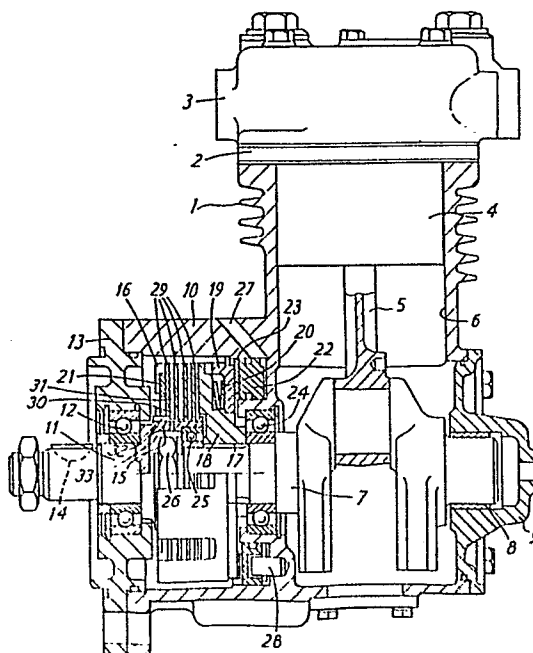
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(54) **Compressor assemblies.**

(57) In a clutch-driven compressor assembly with multiple clutch in the crankcase of the compressor the drive shaft (11) extends into the centre of the clutch and is recessed to accept the outer end of the crankshaft (7) and a retaining nut (26) for the clutch body and an inner bearing (25) on which the input shaft runs, the clutch being releasable to unload the compressor by a pneumatic control signal acting on an annular release piston (22).



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AIR COMPRESSOR ASSEMBLIES

This invention relates to compressor assemblies and relates more particularly to an air compressor assembly incorporating a clutch on the drive shaft thereof.

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It is normal practice to mount air compressors on the engines of vehicles in order to be gear driven continuously to charge air reservoirs for braking systems. It has also been proposed to provide such air compressors with means for rendering them inoperative when an air reservoir being charged has attained a desired compressed air pressure. One manner of achieving this is to provide an unloader valve which can be opened in response to a governor signal to vent the compressor output. This has the shortcoming that when operating off-load an undesirable amount of oil tends to pass into the compression chamber and is then transmitted into the associated system when the compressor comes back into service. Such oil is detrimental to the operation life of the components of the system.

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An alternative proposal has been to provide a clutch in the compressor which enables the compressor to cease rotation in response to a governor signal. Such a clutch has to operate under adverse conditions due to torque reversals of the compressor. The size of such a clutch is restricted by the size of the casing within which it is required to be housed and the present invention seeks to minimise problems associated with a limited support length which may be available for an input shaft

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of such a clutch of a compressor assembly.

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According to the present invention there is provided a
compressor assembly including a housing have a rotatable
5 input shaft for connection to a prime mover said shaft
running in a first outer bearing in the housing and
incorporating an input part of a multi plate clutch
characterised in that said input part is embraced by a
clutch output part drivably located on a compressor shaft
10 and said input part having an axial recess accommodating
retaining means for the clutch output part on the com-
pressor shaft and also inwardly thereof on the compressor
a bearing
shaft/about which the inner end of the input part is
rotatable on the compressor shaft in a disengaged condition
15 of said clutch.

By virtue of the provision of said input part with an
axial recess and said inward bearing the input part is
provided with enhanced support length whilst affording
20 an advantageous and compact construction for the assembly.

In order that the invention may be more clearly under-
stood and readily carried into affect, the sample will be
further described by way of example with reference to
25 the accompanying drawing which illustrates a sectional
view of a single cylinder compressor assembly in accordance
with one embodiment of the invention.

Referring to the drawing the compressor has a cast metal
30 housing in the form of a combined crankcase and cylinder

denoted by reference 1, the cylinder being provided with a valve plate 2 containing the necessary valves co-operating with a cylinder head 3 with suitable inlet and output ports, the details of which are of no consequence in relation to the present invention and may be of a suitable construction. The compressor is provided with a piston 4 and a connecting rod 5 for effecting reciprocation of the piston 4 in the bore 6 of the cylinder by virtue of rotation of a crankshaft 7 the free end of which runs in a bush 8 in an end plate 9 on one end of the crankcase. The other end of the crankcase is provided with a generally cylindrical integrally cast extension 10 which houses a clutch assembly via which the crankshaft is driven by a rotatable input shaft portion 11 which runs in a ball bearing 12 captive in a further end plate 13 on this end of the housing. The outer end of the shaft 11 is provided with a key-way 14 and suitable fixing means for mounting a gear wheel for engagement with a gear train of an internal combustion engine for driving the compressor. The input shaft 11 is integral with an input part 15 of a multi-plate clutch this input part being coaxial with and embraced by an output part 16 of the clutch the output part being carried on a spline 17 on the crankshaft of the compressor.

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The input part 15 has splines 32 engageable with inward projections 30 of inner plates 31. The output part of the clutch comprises a cage 19 of a hub portion with axial slots in which outward projection of outer clutch plates 29 are to locate. Outer part 18 is directly

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splined to the crankshaft at 17. Co-operable with the
outer plates 29 of the clutch the cage 19 is urged into
a clutch engaged position by a pair of annular disc
springs 20. The clutch assembly is retained together
5 by an internal circlip 21 located in the cage 19 for react-
ing the force of the disc springs 20 and pneumatically
operable clutch release means in the form of an annular
piston 22 is provided engageable with the cage 19 through
a thrust member 23 in a sense to compress the springs
10 20 and release the clutch. Piston 22 is keyed against
rotation by a locating pin 28.

The main bearing of the compressor on the drive side is
provided by a substantial ball race 24 and the inward
15 end of the input shaft and clutch input member 15 is
carried on a bearing 25 within^a coaxial recess 33 of the
input part 15. Fixing means for retaining the bearing
on the crankshaft comprises a threaded end portion of the
crankshaft carrying a suitable retaining nut to clamp
20 bearing 24, hub portion 18 and bearing 18 in position
on the crankshaft.

Considering now the manner of putting together the
assembly, the compressor which includes the crankshaft,
25 connecting rod and piston is first assembled together
with the necessary valve plate and cylinder head components.
The output member 16 of the clutch assembly is assembled
as a separate unit with plates properly aligned following
which the pneumatic release piston 22 is placed in
30 position, the clutch assembly comprising the inner and

outer plates and the disc spring 20 (retained together by virtue of the circlip 21) is placed onto the spline 17 on the crankshaft 7 followed by the bearing 25 and the fixing means including the retaining nut 26. Thereafter
5 the input part 15 of the clutch, integral with the shaft 11 already assembled into the bearing 12 in the end cover 13, is introduced into the assembly lining up the shaft form 17 with the internal projections 30 of the clutch plates and inserting the necessary fixing bolts
10 (not shown) for the plate 13.

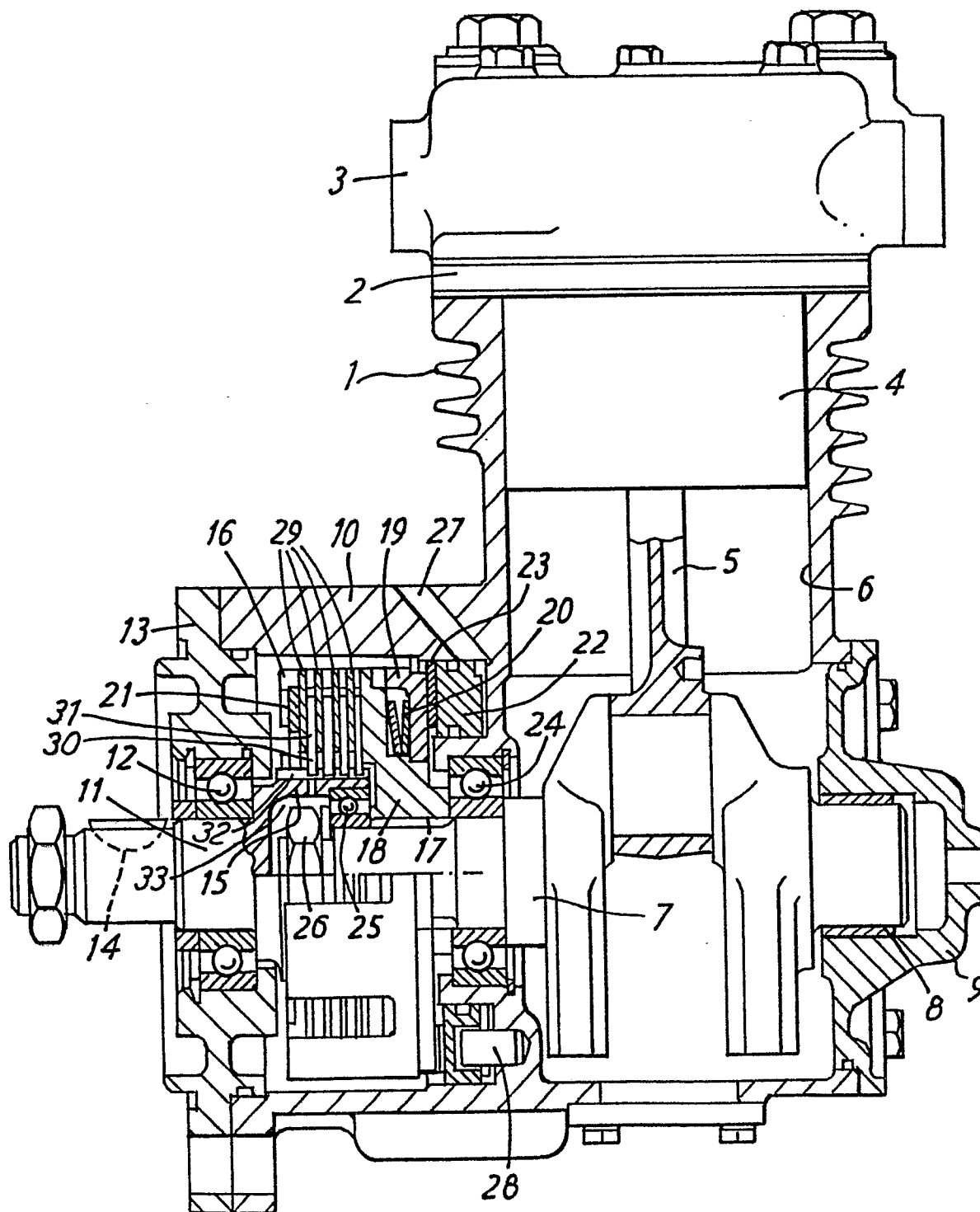
In operation of the assembly, in the absence of a suitable compressed air signal in the control passage 27 from a governor or control valve, the clutch assembly will
15 be in the engaged condition and therefore full drive torque will be applied on the input shaft 11 through the clutch assembly to the crankshaft of the compressor which is therefore in a charging mode for charging compressed air storage reservoirs. Upon attainment of
20 a first predetermined compressed air pressure in the reservoirs, the governor or control valve will provide a pressure signal via the passage 27 to the release piston 22 which will thereby be urged leftwards to compress the disc springs 20 and quickly release the clutch.
25 The compressor then stops until at a second lower pressure the controlling
/ pressure signal in passage 27 is again removed to re-engage the clutch. During the released condition of the clutch, any tendency for rotation of the piston 22 is prevented by a locating peg 28 which holds the
30 piston 22 in a given position in relation to the housing.

CLAIMS

1. A compressor assembly including a housing having a rotatable input shaft (11) for connection to a prime mover said shaft running in a first outer bearing (12) in the housing and incorporating an input part of a multi plate clutch characterised in that said input part (15) is embraced by a clutch output part (18) drivably located on a compressor shaft (7) and said input part having an axial recess (33) accommodating retaining means for the clutch output part (18) on the compressor shaft and also inwardly thereof on the compressor shaft a bearing (25) about which the inner end of the input part (15) is rotatable on the compressor shaft in a disengaged condition of said clutch.
2. A compressor assembly as claimed in claim 1, characterised in that the retaining means comprises a threaded end port of the crankshaft carrying a nut (26) clamping together said output part (18) and said bearing (25).
3. A compressor assembly as claimed in claim 2, characterised in that the nut (26) clamps together said output part (18) said bearing (25) and an adjacent main bearing (24) of the compressor crankshaft.
4. A compressor assembly substantially as described herein with reference to the accompanying drawing.

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EUROPEAN SEARCH REPORT

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Application number

EP 84 30 8173

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	EP-A-0 051 760 (KNORR-BREMSE GmbH) * Figure 1; page 4, line 4 - page 6, line 29 *	1,2	F 04 B 49/02 F 04 B 35/00
Y	GB-A- 525 124 (TAYLOR) * Figure 6; page 4, lines 38-78 *	1,2	
A		3	
A	DE-B-1 273 920 (GEORGE REISCH ASCHAUER) * Figure 1; column 1, line 52 - column 2, line 43 *	1	
A	GB-A-1 414 061 (TOOTH-FORDHAM) * Figures 1-5; page 2, line 38 - page 4, line 73 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 04 B F 16 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-03-1985	Examiner VON ARX H.P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	