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Datasheet for the decision of 28 September 2022

Case Number: T 1972/20 - 3.2.05

Application Number: 17716378.9

Publication Number: 3436724

IPC: F16K11/07, F15B13/04, F15B13/042

Language of the proceedings: EN

Title of invention:
Proportional sequence valve with pressure amplification device

Applicant:
Parker-Hannifin Corporation

Relevant legal provisions:
EPC Art. 56, 111(1) sentence 2
RPBA 2020 Art. 11

Keyword:
Inventive step - main request (yes)
Appeal decision - remittal to the department of first instance (yes)

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Case Number: T 1972/20 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 28 September 2022

Appellant: (Applicant)	Parker-Hannifin Corporation 6035 Parkland Boulevard Cleveland, Ohio 44124-4141 (US)
Representative:	Davies, Gregory Mark Murgitroyd & Company Cardiff Churchill House Churchill Way Cardiff CF10 2HH (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 15 July 2020 refusing European patent application No. 17716378.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	P. Lanz
Members:	M. Holz
	A. Bacchin

Summary of Facts and Submissions

I. The applicant lodged an appeal against the examining division's decision to refuse European patent application No. 17 716 378.9.

The decision under appeal is based only on the examining division's conclusion that the subject-matter of claim 1 of the sole request underlying the decision under appeal did not involve an inventive step in view of a combination of document D1 and the skilled person's common general knowledge as demonstrated, for example, in document D4 (see point 16 of the Reasons).

II. The following documents cited in the proceedings before the department of first instance are relevant to this decision.

D1: FR 53 004
D4: EP 2 772 373 A2

III. The appellant has requested that the decision under appeal be set aside and that a patent be granted based on the claims according to the main request or the auxiliary request, both of which were filed with the statement of grounds of appeal, or that the case be remitted to the examining division for further prosecution in writing (see page 1 of the statement of grounds of appeal).

If, at any stage, the board is minded to "refuse this application", the appellant will request oral proceedings (see page 6 of the statement of grounds of

appeal). The board understands this request as an auxiliary request for oral proceedings in the event the board intends to dismiss the appeal.

IV. Claim 1 of the main request reads as follows (the feature references employed by the board are indicated in square brackets):

"**[1.1]** A valve member (10) for operating a hydraulic actuating device (24) comprising:
[1.2] a valve body (12) defining a supply port (14), a tank port (18), and a controlled port (22) fluidly connectable between the hydraulic actuating device (24) and at least one of the supply port (14) and the tank port (18);
[1.3] a pressure control port (26);
[1.4] a slideable spool (38) for fluidly connecting the controlled port (22) with at least one of the supply port (14) and the tank port (18), wherein the slideable spool (38) has a first end (53), a second end (54), and a bore chamber (42) extending between the first and second end; and
[1.5] a pin (40) that is received within the bore chamber (42) at the second end (54) of the spool and is slideable relative to the spool (38),
[1.6] wherein the spool (38) is biased in a first direction by a biasing force that acts on a cross-sectional area of the spool at the first end (53) of the spool; and
[1.7] wherein the spool (38) moves in a second direction opposite the first direction within the valve body (12) in response to pressure from the pressure control port (26) that acts on an annular area of the spool (38) and on a cross-sectional area of the pin (40) at the second end (54) of the spool;
[1.8] wherein the spool (38) is moveable between a

first position and a second position, the first position being defined by the tank port (18) being fluidly connected to the controlled port (22) and the second position being defined by the supply port (14) being fluidly connected to the controlled port (22), wherein the spool (38) moves in the first direction towards the first position, and wherein the spool moves in the second direction towards the second position; and

[1.9] characterized in that the spool (38) is moveable to a third position that is defined by the supply port (14) and the tank port (18) being fluidly connected to the controlled port (22)."

V. The appellant's submissions, where relevant to this decision, can be summarised as follows:

Besides feature 1.9, document D1 did not disclose feature 1.6, either. When spool 80 was moving in a given direction, there was no fluid opposing it in the other direction, since fluid in the opposite chamber had to be vented through the other pressure port to allow the spool to move. Therefore, no biasing force acted on the spool. In the present application, the biasing force (applied by the spring) continued to act when the spool moved from the first position into the second direction.

Furthermore, the formulation of the objective technical problem in the decision under appeal was incorrect. The invention lay in the realisation that in a valve structure having all the technical features of claim 1, a valve structure could be realised that achieved the first, second and third configurations as defined between the tank port, controlled port and supply port of claim 1.

The examining division's view that reducing the size of the spool land to provide simultaneous communication of the middle port with the adjacent ones in the middle position constituted an obvious modification was incorrect. The skilled person would have needed to make three modifications to the valve of document D1 that were not obvious to make. The examining division did not identify any reasons why these modifications would have been obvious.

Reasons for the Decision

1. Inventive step regarding claim 1 of the main request in view of document D1 as the closest prior art (Article 56 EPC)

1.1 *Differentiating feature(s)*

In the decision under appeal, the examining division considered feature 1.9 to be the only differentiating feature of claim 1 over document D1.

The appellant, in contrast, takes the view that document D1 did not disclose feature 1.6, either. While the examining division considered that, in document D1, a biasing force was applied by the fluid pressure, the appellant has submitted that, in document D1, when spool 80 was moving in a given direction, there was no fluid opposing it in the other direction, since fluid in the opposite chamber had to be vented through the other pressure port to allow the spool to move. In the present application, the biasing force (applied by the spring) continued to act when the spool moved from the first position into the second direction.

The board notes that neither feature 1.6 nor claim 1 as a whole requires the provision of a spring to apply the biasing force defined in feature 1.6. Claim 1 is not limiting as to the means for generating the biasing force.

Moreover, claim 1 does not require the biasing force to act in one direction at the same time that spool 80 moves into the opposing direction. According to entries 5.a. and 5.b. of the Oxford English Dictionary under the word "bias", this term can mean, for example, "*[a] physical inclination in a specified direction; a tendency to lean, turn, etc., to one side*" or "*[a] tendency to move in a certain direction or way, given to an armature, pointer, etc. (e.g. by a spring, weight, or magnetic field)*". The term "biasing force" is thus not limited to situations where the force acts in a direction opposite to the current direction of movement of the spool. Such a course of action is not required by claim 1 as a whole, either.

According to page 2, lines 1 to 4, of document D1:

> "*Dans la position représentée, la pression de commande arrive du conduit 63 et elle a poussé l'organe distributeur vers la droite.*"

Or, in English:

> "*In the position shown, the control pressure comes from conduit 63 and it has pushed the distributing member to the right*" (translation by the board).

Hence, according to document D1, the pressure generated by the fluid arriving through conduit 63 exerts a

biasing force on the spool ("*l'organe distributeur*"), pushing the spool towards the right-hand side in the Figure. Consequently, feature 1.6 is disclosed in document D1.

However, the board agrees with the appellant and the examining division that feature 1.9 is not disclosed in document D1.

1.2 *Objective technical problem*

In the decision under appeal, the examining division considered the objective technical problem to be how to provide simultaneous communication of one port with the two adjacent ports.

The appellant disagrees and has submitted that the invention lies in the realisation that in a valve structure having all the technical features of claim 1, a valve structure could be realised that achieved the first, second and third configurations as defined between the tank port, controlled port and supply port of claim 1.

According to established case law, the technical problem has to be formulated in such a way that it does not contain pointers to the solution or partially anticipate the solution, since including part of a solution offered by an invention in the statement of the problem necessarily results in an *ex post facto* view being taken of inventive step when the state of the art is assessed in terms of that problem (see "Case Law of the Boards of Appeal of the European Patent Office", Tenth Edition, July 2022 - "Case Law" -, I.D. 4.2.1).

The formulation of the objective technical problem employed by the examining division encompasses the rephrasing of feature 1.9 and therefore partially anticipates the claimed solution. The formulation suggested by the examining division is thus inappropriate.

The third position defined in feature 1.9 is addressed on page 6, line 27, to page 7, line 5, and on page 9, lines 22 to 28, of the description as originally filed. However, the application as a whole does not expressly indicate what technical effect is achieved by this feature. Yet since claim 1 defines that the third position is attainable in addition to the first and second positions, it is plausible that a technical effect of feature 1.9 lies in the more flexible usability of the valve member.

The objective technical problem is thus the provision of a valve member having more flexible usability.

1.3 *Solution to the objective technical problem*

In the decision under appeal, the examining division set out that reducing the size of the spool land to provide simultaneous communication of the middle port with the adjacent ones in the middle position constituted an obvious modification that the skilled person would have performed without an inventive step as this was already generally known in the field, see, for instance, document D4, Figures 2 to 4.

The appellant disagrees and has submitted that the skilled person would have needed to make three modifications to the valve of document D1 that were not obvious to make and that the examining division did not

identify any reasons why these modifications would have been obvious.

The board does not find the examining division's line of argument persuasive.

Firstly, document D4 is a patent document. Common general knowledge does not, however, normally include patent literature (see "Case Law", I.C.2.8.2). It is not apparent if or to what extent Figures 2 to 4 of document D4 demonstrate the skilled person's common general knowledge.

Secondly, document D4 does not suggest feature 1.9 for solving the above objective technical problem. Figure 4 of document D4 shows an arrangement in which port P is in fluid communication with two adjacent ports A and B:

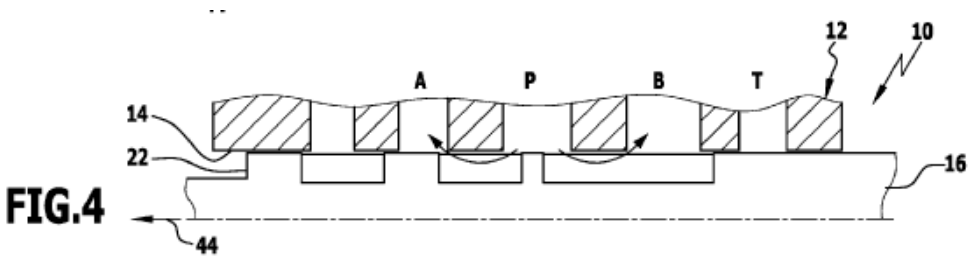
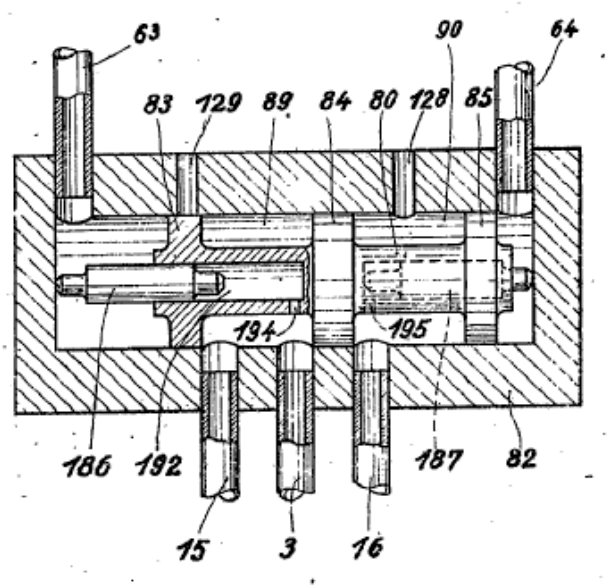


FIG.4

According to the abstract and paragraphs [0040] to [0042] of document D4, port P is the pressure port ("*Druckanschluss*") and ports A and B are working ports ("*Arbeitsanschlüsse*"). The sequence of Figures 1 to 4 of document D4 shows that working ports A and B are sequentially disconnected from tank port T and connected to pressure port P (see the abstract and paragraph [0049] of document D4). This course of action is in line with the purpose of the valve described in document D4, which is a proportional directional control valve (see, for example, paragraph [0001]) having the flow characteristics shown in Figure 5.

In contrast, in the embodiment of document D1 (see the Figure below), only three ports are provided, where conduit 3 is a supply conduit and conduits 15 and 16 lead to operating cylinders.



The issue of sequentially disconnecting working ports from a tank port and connecting them to a pressure port (discussed in document D4) does not arise in the context of document D1.

Moreover, starting from document D1, a spool position in which supply conduit 3 is simultaneously in fluid communication with conduits 15 and 16 is not straightforward to obtain, even if the spool land were to be reduced as suggested by the examining division. In document D1, the position of spool 80 is controlled by the pressure applied through control conduits 63 and 64 (see page 2, lines 1 to 29). It is not easy to see how spool 80 could be brought into a position where piston 84 (having a reduced thickness as apparently suggested by the examining division) is located above conduit 3, or how piston 84 could be maintained in this position once it has been reached. Depending on the initial position of spool 80, it would seem necessary

to apply pressure on both conduits 63 and 64 and to carefully control the respective pressure values over time, also taking into account the pressure of the fluid in conduits 3, 15 and 16. This seems even more difficult as the operating fluid passes from supply conduit 3 through openings 194 and 195 and applies forces on auxiliary pistons 186, 187, pressing the auxiliary pistons to the walls of casing 82 (see column 2, lines 23 to 29).

Thus, even if the skilled person had consulted document D4, they would not have been prompted to provide feature 1.9 in the context of the valve member of document D1.

1.4 *Summary regarding the main request*

The objection that the subject-matter of claim 1 did not involve an inventive step in view of a combination of document D1 and the skilled person's common general knowledge does not prejudice the grant of a patent based on the claims according to the main request. Moreover, the subject-matter of claim 1 of the main request involves an inventive step in view of a combination of documents D1 and D4.

2. Remittal

As set out above, the sole objection on which the decision under appeal is based does not prejudice the grant of a patent based on the claims according to the main request. The decision under appeal is thus to be set aside.

The appellant also requested remittal of the case to the examining division for further prosecution. As the

board has not been able to discern whether other objections may prejudice the grant of a patent, there are special reasons pursuant to Article 11 RPBA 2020 (cf. OJ EPO 2019, A63). It is thus appropriate to remit the case to the examining division for further prosecution on the basis of the main request (Article 111(1) EPC and Article 11 RPBA 2020).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division for further prosecution.

The Registrar: The Chairman:

N. Schneider P. Lanz

Decision electronically authenticated