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**Datasheet for the decision
of 17 May 2021**

Case Number: T 2017/19 - 3.2.01

Application Number: 13005250.9

Publication Number: 2727842

IPC: B64F1/305, B64F1/36, F24F13/02

Language of the proceedings: EN

Title of invention:
Hose management system for supplying conditioned air to an aircraft

Patent Proprietor:
Twist Inc.

Opponents:
1. thyssenkrupp Airport Solutions, S.A.
2. TK Elevator Innovation and Operations GmbH

Headword:

Relevant legal provisions:
EPC Art. 123(2), 56

Keyword:

Amendments - extension beyond the content of the application
as filed (no)

Inventive step - main request (yes) - non-obvious solution -
ex post facto analysis

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2017/19 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 17 May 2021

Appellants:

(Opponents)

1. thyssenkrupp Airport Solutions, S.A.
Poligono Industrial Vega des Baina s/n
33682 Mieres (Asturias) (ES)

2. TK Elevator Innovation and Operations GmbH
ThyssenKrupp Allee 1
45143 Essen (DE)

Representative:

Michalski Hüttermann & Partner
Patentanwälte mbB
Speditionstraße 21
40221 Düsseldorf (DE)

Respondent:

(Patent Proprietor)

Twist Inc.
P.O. Box 177
Jamestown OH 45335 (US)

Representative:

Beyer, Andreas
Wuesthoff & Wuesthoff
Patentanwälte PartG mbB
Schweigerstrasse 2
81541 München (DE)

Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 21 June 2019
rejecting the opposition filed against European
patent No. 2727842 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman	G. Pricolo
Members:	A. Wagner
	O. Loizou

Summary of Facts and Submissions

- I. The appeal of the opponents lies against the decision of the opposition division to reject the opposition filed against European patent No. 2 727 842.
- II. In its decision, the opposition division held that none of the grounds of opposition raised by the opponents under Article 100(a) EPC in combination with Article 56 EPC and under Article 100(c) EPC was prejudicial to the maintenance of the patent as granted. With regard to Article 56 EPC, the Opposition Division found that the subject-matter of claim 1 was inventive over the following prior art:
- E1: US 2002/0195156 A1
E2: WO 2005/003611 A2
E3: Excerpt from Wikipedia "Zugmitteltrieb"
E4: WO 2007/081375 A2
- III. Oral proceedings by videoconference were held before the Board on 17 May 2021.
- IV. The appellants (opponents 1 and 2) requested that the decision under appeal be set aside and that the patent be revoked.
- The respondent (patent proprietor) requested that the appeal be dismissed and the patent be maintained as granted.
- V. Claim 1 as granted reads as follows (feature analysis as proposed by the appellants):

- 1.1** An apparatus (10) for providing conditioned air (90) to an aircraft (250) comprising:
 - 1.2** a substantially closed housing (12) having an air inlet end (26), and an air outlet end (28);
 - 1.3** a hose hanger (82) inside the housing (12);
 - 1.4** a longitudinally collapsible hose (16; 42)
 - 1.5** having a length at least twice the length of the housing (12),
 - 1.6** an inlet end (270), an outlet end (263),
 - 1.7** wherein said longitudinally collapsible hose (16; 42) is disposed within the housing (12) so that the inlet end (270) is proximate the air inlet end (26), and the outlet end (263) is exterior to the air outlet end (28); and
 - 1.8** a drive unit (74) inside the housing (12) proximate the air outlet end (28),
 - 1.9** that contacts the outside surface of the hose (16; 42) to selectively push the outlet end (263) in a first direction away from the inlet end (270), or pull the outlet end (263) in a second direction towards the inlet end (270),
- characterised by
- 1.10** said drive unit (74) comprising at least first and second drive shafts (126, 128)
 - 1.11** configured to provide force applied to said hose (16; 42),

1.12 the first and second drive shafts (126, 128) coupled together to a drive motor (118) by a drive chain (134).

VI. The appellants (opponents) essentially argued as follows:

Added subject-matter

The wording of feature 1.11 "configured to provide force" was broader than the original wording "generating force". A drive shaft generating a force had the meaning of a directly driven shaft, e.g. a motor shaft. Thus the term "generating" was limited to "initially providing" while the meaning of "providing" could be "generate" but also "transmit", "convert" or "discharge", the latter e.g. in combination with a spring.

Alternatively, as brought forward during oral proceedings, "shafts generating force applied to the hose" meant that the force had to act directly on the hose. "Providing" additionally covered an indirect impact on the hose.

Furthermore no basis for the amendment could be found in the description but only in claim 27 of the parent application (see also original application, column 17, "Example 27"). Contrary to the reasoning of the impugned decision (chapter 3.2, lines 6-8) the amendment could not be considered to be a correction of an obvious error.

Inventive step

The conclusion of the opposition division that the subject-matter of claim 1 as granted involved an inventive step starting from E1 was wrong as the

distinguishing features were incorrectly identified. Contrary to the opposition division's analysis that claim 1 differed by features 1.10 to 1.12, the only difference of claim 1 over E1 was that the coupling between the disclosed first and second drive shafts and the disclosed drive motor was done by a drive chain (feature 1.12).

E1 with general knowledge or E3:

As the wording of claim 1, in particular in view of the drive unit, was broad, two lines of attack were possible.

According to the first line of attack the claimed motor could also be the motor of one of the belt drive units 75. Claim 1 was not limited to a single motor for the drive unit as a whole. Based thereon, E1, fig. 7 with par. [0065], disclosed a drive unit 522 having at least two drive shafts 526 configured to provide force applied to the hose 506 and coupled together to a motor 525 by a belt 524. The designation of parts 526 as cog rollers did not exclude them to be considered as shafts. A shaft as a turning part could be hollow and/or designed as pinion shaft, thus the term 'shaft' comprised a cog roller. Claim 1 only differed in that a drive chain was applied instead of a belt. It was part of the general knowledge of the skilled person (e.g. E3) that a chain is an equivalent alternative to a belt. A chain could be equally provided with grooves 527 as shown in E1, fig. 7. to interact with protrusions 507 of the hose. Therefore the claimed subject-matter did not involve an inventive step.

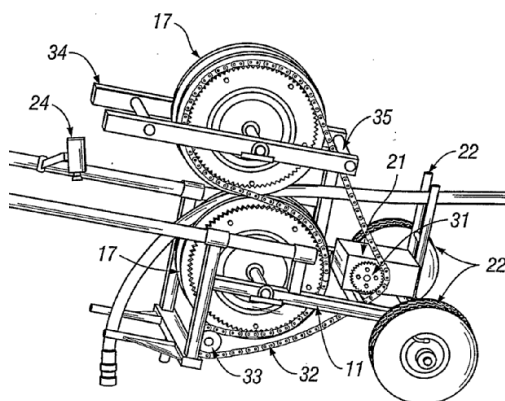
In the second line of attack reference was made to E1, fig. 2 with par. [0053], wherein it was disclosed that the drive units 122 might be powered by a single motor.

In this case, each of the drive units 122 implicitly needed a force transmitting shaft. These drive shafts of the sub-units 122 simply had to be coupled. The only difference would thus be that the coupling was done by a drive chain. The objective technical problem was how to realise the coupling between a single motor and the drive units 122.

As E1 already disclosed several cog rollers coupled by a belt, it was obvious for a skilled person to also couple at least two of the drive shafts of the drive units 122 by commonly known pulling means like belts or chains.

E1 with E2:

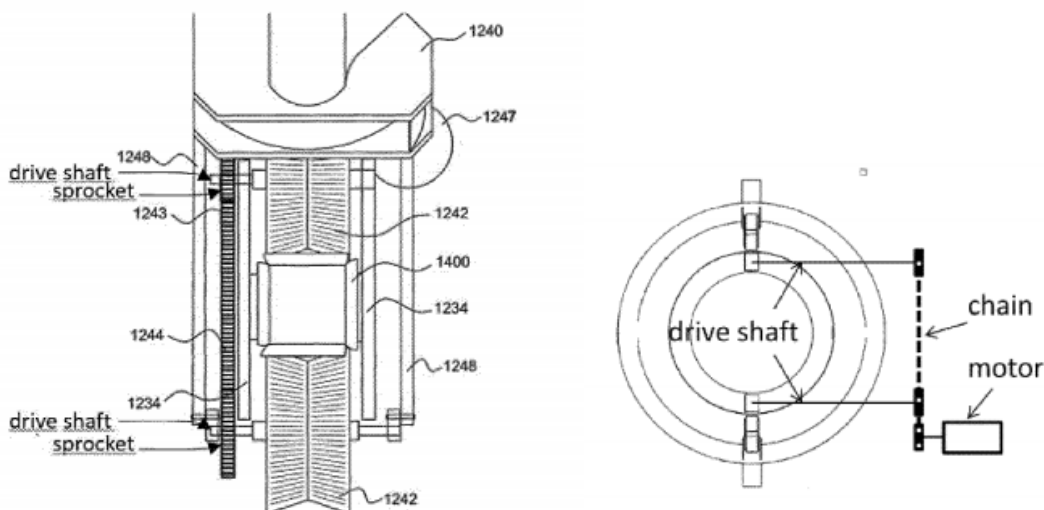
Still within the framework of the second line of attack, E2 provided a solution to the problem posed. E2, fig. 5 (see below), showed two puller wheels 17, made of aluminium (par. [0044]), each having an axle being the first and second drive shafts. Alternatively, the puller wheels 17 themselves represented the first and second drive shafts as they transmitted a torque and applied a force to the hose as defined by the claim. The term "shaft" also comprised puller wheels. The skilled person recognized that the drive shafts of E2 were coupled together to a drive motor 21 by a drive chain 32 and would thus be able to solve the problem posed.



E1 with E4:

The skilled person considered E4 in combination with E1 as both documents referred to a hose storage with the object to minimize the volume while reducing wear of the hose (E1, par. [0027, 0028] and E4, page 1, third and fourth paragraph). Still within the framework of the second line of attack, it became clear from E1, par. [0031, 0050] that for the functioning of the E1-apparatus two drive units were sufficient. E4 fig. 29 and fig. 32 (see left hand figure below) with page 17, lines 34-35, disclosed first and second drive shafts transmitting force from the sprocket to the drive wheels 1242 according to features 1.10 to 1.12. The drive chain 1244 coupled the drive shafts to the motor 1240. The skilled person, simply looking for transmission means between two shafts and a motor, would see a solution to the problem posed and would arrive at an apparatus according to claim 1 without any inventive activity.

According to the appellants the solution as shown in the right hand figure below was obvious.



VII. The respondent's arguments relevant to the present decision may be summarised as follows:

Added subject-matter

As basis for the amendment in feature 1.11 not only claim 27 of the parent application was relevant but the patent application as a whole. Therein ample parts made it unambiguously clear that "generate" was used in the sense of "provide". A shaft per se could not generate a force, thus the term "generate" was obviously incorrect.

Inventive step

E1 with general knowledge or E3:

Concerning the first line of attack, a skilled person would neither consider a support shaft of the cog roller 526 nor the cog roller itself as a drive shaft. The terms "cog roller" and "drive shaft" had clearly different technical meanings. Not all turning element able to transmit a torque were implicitly shafts. Furthermore nowhere in the patent in suit the drive unit of the apparatus comprised more than one motor. The understanding of claim 1 according to the first line of attack was technically not convincing. Concerning the second line of attack, E3 only set out the general aspects of traction-type transmissions. E3 did not include any reference to a device according to E1 or any hint that would prompt the skilled person to the claimed subject-matter. The appellants' observations were mere speculations.

E1 with E2:

The technical field of E2 differed from the technical field of the patent in suit. E2 was directed to a

portable hose puller and not combinable with an apparatus according to E1 for an aircraft. Furthermore the axles supporting the puller wheels 17 did not receive any driving force, but were used to mechanically support the puller wheels 17. The axles were not part of the drive train that provided force applied to the hose (feature 1.11). Additionally a skilled person would not consider the puller wheels as drive shaft but perceived them as components technically different from a drive shaft. The only conceivable drive shaft in the apparatus of E2 was the drive shaft of the motor 21 which was connected to the sprocket 31.

E1 with E4:

The technical field of E4 was completely different from the technical field of the patent in suit. The skilled person would not even come across E4 as the document was classified in a different IPC class. E4 was directed to the deployment of a vacuum hose for drawing out water out of a swimming pool. Furthermore the teaching of E4 could not easily be transferred to the E1 device. The skilled person had to select particular feature while E4 did not provide any hint which features had to be taken. The appellants' argumentation was based on hindsight.

Reasons for the Decision

1. Added subject-matter (Article 100(c) EPC)

1.1 The subject-matter of the patent in suit does not extend beyond the content of the application as filed. Accordingly, the ground for opposition under Article 100(c) EPC does not prejudice maintenance of the patent as granted.

- 1.2 The Board confirms the view of the opposition division that in the context of the patent the term "generate" corresponds to the term "provide".
- 1.3 The appellants' arguments that the term "provide" is more generic, as the term "generate" implies specific features of the shaft unit, are not convincing.
 - 1.3.1 In the patent in suit (see fig. 4 with par. [0020], corresponding to par. [0018] of the originally filed application) the drive shafts (126, 128, 130) are neither disclosed as directly driven motor shafts nor as drive shafts applying the force directly on the hose.
 - 1.3.2 As acknowledged by the appellants during oral proceedings a shaft per se cannot generate a force. Thus, from the original wording "drive shafts generating force" the skilled person understands that an initial force generating means is provided, originally disclosed as a drive motor (118).
 - 1.3.3 In the context of the original disclosure (e.g. fig. 4, par. [0018]), the skilled person understands the term "generate" in the sense of transmitting, thereby also as providing. As originally only a motor and no spring is disclosed to initially generate force, the term "provide" is not disclosed in the sense of "discharge". Furthermore the term "generating" originally did not exclude a conversion. Actually by means of the arrangement comprising two miter gears 146, 148, a belt pulley 152 and a belt 154, the shafts "convert" the force applied to the hose. Hence, the amendment does not provide any new technical information over the application as filed. In fact, in the context used, the

word "generate" is as broad as the word "provide".

2. Inventive step

- 2.1 The subject-matter of claim 1 as granted involves an inventive step over the prior art cited by the appellants (Article 56 EPC).
- 2.2 The closest prior art is represented by document E1 which discloses the features 1.1 to 1.9 as found by the opposition division and also acknowledged by the parties.
- 2.3 Concerning the distinguishing features 1.10 to 1.12, E1 discloses in paragraph [0053] (see fig. 1, 3), that "*The drive units 122 may be powered by a single motor, or each drive unit 122 may be powered by a motor.*"
- 2.3.1 The Board agrees with the appellants that in the context of the disclosure the motor obligatorily has a drive shaft that applies force to the hose. However the argument of an implicit disclosure of further drive shafts for each of the drive units 122 in case of a single motor can not be followed. E1 does not disclose any technical solution for the use of a single motor.
- 2.3.2 Thus claim 1 differs from the disclosure of E1 in that the drive unit comprises at least a second drive shaft (feature 1.10), also configured to provide force applied to the hose (feature 1.11), wherein both drive shafts are coupled together to the drive motor by a drive chain (feature 1.11).
As indicated by the appellants, these features solve the problem to provide a technical solution for the embodiment of E1, in which "*the drive units 122 may be*

powered by a single motor". The objective technical problem is not disputed.

2.4 The appellants contested that the subject-matter of claim 1 involves an inventive step starting from E1 in combination with the skilled person's common general knowledge, as shown e.g. in E3, or in combination with any of E2, E3 or E4. The Board confirms the impugned decision, in particular regarding points 4.6 to 4.9 of the reasons. The arguments of the appellants brought forward during appeal proceedings are not convincing for the following reasons.

2.4.1 E2, directed to a portable hose puller (see e.g. fig. 6), and E4, directed to a pool-cleaning system (page 1, first paragraph, fig. 29), are not combinable with E1, directed to a device for supplying conditioned air to an aircraft (par. [0002]). The technical fields are neither the same nor neighboured. The fact that both E2 and E4 also refer to a hose is not sufficient to justify their suitability as a second document in an inventive step argumentation starting from E1.

2.4.2 The first line of attack concerning the combination of E1 with common general knowledge or with E3 was presented for the first time during oral proceedings. Therein the cog rollers 526 of E1 (fig. 7) were presented as drive shaft. The Board follows the respondent that a skilled person technically distinguishes between a drive shaft and a cog roller. The skilled person would not consider the cog rollers themselves nor their supporting shafts as drive shafts.

2.4.3 According to the second line of attack, E1 allegedly discloses a drive shaft for each of the drive units 122

which only need to be connected by a drive chain generally known or as disclosed in E3.

The Board agrees that chain drives in general are part of the skilled person's knowledge. However neither this knowledge nor E3 hints at the design of a drive means for a collapsible hose to supply conditioned air to an aircraft. E3 refers to two axially parallel drive shafts coupled by a belt or a chain. Even if claim 1 only defines two drive shafts, E1 teaches to power four drive units arranged circumferentially around the hose by a single motor. An obvious implementation of the teaching of E3 into E1 is not apparent.

2.4.4 Even if, in the context of the second line of attack, the skilled person were to consider E2, the skilled person would not arrive at the claimed subject-matter. In E2 either the support shafts of the puller wheels 17 or, as submitted for the first time during oral proceedings, the puller wheels 17 themselves, were presented as drive shafts by the appellants. However the shafts have the function of supporting the puller wheels 17 and a puller wheel differs technically from a drive shaft. Both parts would not be considered to be drive shafts by the skilled person. As indicated by the respondent, the only conceivable drive shaft in the apparatus of E2 is the drive shaft of the motor 21 which is connected to the sprocket 31.

2.4.5 Even if the skilled person were to combine E1 with E4 on the basis of the second line of attack, the different construction of the E4-device renders unobvious which parts would have to be selected to solve the problem posed. The approach which suggests taking out of the E4-drive only the chain 1244 coupling the two shafts of the drive wheels 1242 to put in practice a technical solution for powering the four

drive units 122 of the E1-device, is based on hindsight.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Magliano

G. Pricolo

Decision electronically authenticated