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**Datasheet for the decision
of 27 July 2022**

Case Number: T 2306/17 - 3.5.04

Application Number: 09747081.9

Publication Number: 2286586

IPC: H04N7/15, H04N5/74, H04N7/14

Language of the proceedings: EN

Title of invention:
GAZE ACCURATE VIDEO CONFERENCING

Applicant:
Microsoft Technology Licensing, LLC

Headword:

Relevant legal provisions:
RPBA 2020 Art. 13(1), 13(2)
EPC Art. 56, 84, 123(2)
EPC R. 43(2)(c)

Keyword:

Main request - amendment after summons - exceptional
circumstances (yes)

Main request - claims - clarity (yes)

Main request - amendments - added subject-matter (no)

Main request - inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 2306/17 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 27 July 2022

Appellant: Microsoft Technology Licensing, LLC
(Applicant) One Microsoft Way
Redmond, WA 98052-6399 (US)

Representative: Grünecker Patent- und Rechtsanwälte
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 18 May 2017
refusing European patent application
No. 09747081.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair B. Willems
Members: A. Seeger
T. Karamanli

Summary of Facts and Submissions

I. The appeal is against the examining division's decision to refuse European patent application No. 09 747 081.9, published as international patent application WO 2009/139995 A2.

II. The documents cited in the decision under appeal included the following:

D1: US 2005/0024489 A1

D2: WO 01/72037 A1

D3: US 5 675 376 A

D4: US 5 801 758 A

D5: Shinichi Shiwa: "*A large-screen visual telecommunications device using a liquid-crystal screen to provide eye contact*", Journal of the Society for Information Display, vol. 1, no. 1, January 1993, pages 37 to 41, XP000510926

D6: Asad Khan et al.: "*27.4: Super high brightness reflective cholesteric display*", 2001 SID International Symposium, 3 to 8 June 2001, San Jose, California, US, vol. 32, no. 1, pages 460 to 463, XP007007693

D7: US 5 438 357 A

III. The decision under appeal was based on the grounds that the subject-matter of the independent claims according to the then main request and auxiliary requests I

and II lacked inventive step within the meaning of Article 56 EPC. In particular, the examining division found that the feature "*a face detection system to locate a face in the display image and align eyes of the face with the camera*" was obvious in view of document D7 (see decision under appeal, section 2).

- IV. With the statement of grounds of appeal, the appellant maintained the main request and auxiliary requests I and II on which the impugned decision was based. Further, the appellant filed a new auxiliary request labelled "Auxiliary request A". As a further auxiliary measure, the appellant requested oral proceedings in the event that its main request was not considered allowable.
- V. On 1 September 2021, a summons to oral proceedings was issued. On 24 January 2022, a communication under Article 15(1) of the Rules of Procedure of the Boards of Appeal in the version of 2020 (RPBA 2020, OJ EPO 2019, A63) was issued. In that communication, the board expressed the following preliminary opinion.
- Claim 9 of the main request was not clear (Article 84 EPC) and the subject-matter of claims 1 and 14 of the main request did not involve an inventive step within the meaning of Article 56 EPC.
 - The independent claims of auxiliary request A were not clear (Article 84 EPC).
 - Claim 8 of auxiliary request I was not clear (Article 84 EPC) and the subject-matter of claims 1 and 12 of auxiliary request I did not involve an inventive step within the meaning of Article 56 EPC.

- The independent claims of auxiliary request II were not clear (Article 84 EPC).

VI. By letter of reply dated 29 April 2022, the appellant filed amended claims according to main requests A and B (to be inserted between the main request and auxiliary request A), auxiliary requests B and C (to be inserted between auxiliary request A and auxiliary request I) and auxiliary requests IIa and IIb (to follow auxiliary request II).

VII. On 20 May 2022, the board issued a further communication. In this communication, the board expressed its preliminary opinion that the subject-matter of the independent claims of auxiliary request IIb was not obvious. However, the set of claims according to auxiliary request IIb still gave rise to objections under Article 84 EPC and Rule 43(2)(c) EPC.

VIII. On 22 June 2022, the oral proceedings appointed for 1 July 2022 were rescheduled to 11 July 2022.

IX. By letter dated 23 June 2022, the appellant filed claims and amended description pages according to a new main request. The appellant's main request was thus that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:

Description:

Pages 1 to 13 and 15 as published

Pages 14 and 16 filed with the letter of
23 June 2022

Claims:

Nos. 1 to 7 filed with the letter of 23 June 2022

Drawings:

Sheets 1/4 to 4/4 as published

- X. The appellant was informed by the registrar's communication dated 6 July 2022 that the oral proceedings appointed for 11 July 2022 had been cancelled.
- XI. The independent claims of the main request read as follows:
- "1. A video conferencing system (80), comprising:
- a waveguide (92) having an input edge (94) and a viewing surface (96), the waveguide being configured to receive a display image at the input edge and output the display image from the viewing surface;
- a projector (86) positioned to project the display image into the input edge, through the waveguide, and out of the viewing surface;
- a camera (84) positioned to view a camera image traveling into the viewing surface and through the waveguide;
- a screen (82) substantially covering the viewing surface of the waveguide and configured to selectively switch between a substantially transparent state and a light-scattering state, where the screen includes a polymer stabilized cholesteric textured liquid crystal optical shutter; and
- a sync system (90) configured to cause the screen to alternate between the substantially transparent state

and the light-scattering state, configured to cause the camera to view the camera image while the screen is in the substantially transparent state, and configured to cause the projector to project the display image into the input edge while the screen is in the light-scattering state,

where the sync system is configured to dynamically adjust a ratio of time the screen is in the transparent state relative to a time the screen is in the light-scattering state responsive to changes in an ambient brightness,

further comprising a face detection system configured to locate a face in the display image and align eyes of the face with the camera, wherein the camera's position and orientation is aligned with the eyes of a face displayed on the screen, such that the camera has the same view as the eyes of the face being displayed, wherein the optical axis of the camera is perpendicular to a viewing surface of the screen and wherein the optical axis of the camera intersects the screen in a point positioned between the eyes of the face, where the camera is moved to align eyes of the face with the camera.

5. A video conferencing system (10), comprising:

a screen (12) selectively switchable between a substantially transparent state and a light-scattering state, where the screen includes a polymer stabilized cholesteric textured liquid crystal optical shutter;

a camera (14) positioned to view a camera image traveling through the screen;

a projector (16) positioned to project a display image at the screen;

a face detection system (18) to locate a face in the display image and align eyes of the face with the camera, wherein the camera's position and orientation is aligned with the eyes of a face displayed on the screen, such that the camera has the same view as the eyes of the face being displayed, wherein the optical axis of the camera is perpendicular to a viewing surface of the screen and wherein the optical axis of the camera intersects the screen in a point positioned between the eyes of the face, where the camera is moved to align eyes of the face with the camera; and

a sync system (20) configured to cause the screen to alternate between the substantially transparent state and the light-scattering state, configured to cause the camera to view the camera image while the screen is in the substantially transparent state, and configured to cause the projector to project the display image while the screen is in the light-scattering state,

where the sync system is configured to dynamically adjust a ratio of time the screen is in the transparent state relative to a time the screen is in the light-scattering state responsive to an ambient brightness."

Claims 2 to 4 and 6 and 7 depend on claims 1 and 5, respectively.

Reasons for the Decision

1. Main request - admittance (Article 13 RPBA 2020)

- 1.1 The main request was filed by letter dated 23 June 2022, i.e. after notification of the summons to oral proceedings. The main request is therefore an amendment within the meaning of Article 13(2) RPBA 2020.
- 1.2 In the communication under Article 15(1) RPBA 2020, the board raised a new objection of lack of clarity (see point V. above). In response to this new objection and to further objections raised in the subsequent communication of the board dated 20 May 2022, the appellant filed the present main request with the aim of overcoming these objections. These are exceptional circumstances within the meaning of Article 13(2) RPBA 2020.
- 1.3 Furthermore, the appellant demonstrated that the claims of the main request, *prima facie*, overcame the objections raised by the board and did not give rise to new objections (see sections 2. to 5. below).
- 1.4 Hence, the board exercises its discretion under Article 13(2) RPBA 2020, taking the criteria of Article 13(1) RPBA 2020 into account, and decides to admit the main request into the appeal proceedings.
2. Main request - clarity (Article 84 EPC)
 - 2.1 In point 4 of its communication dated 24 January 2022, the board objected that the feature "*a face detection system (18) to locate a face in the display image and align eyes of the face with the camera*" in claim 9 of the version of the main request pending at that time was not clear. It was not clear how a device in a three-dimensional space, such as a camera, could be aligned with an element in an image shown on a screen.

This objection was overcome by amending the independent claims of the main request to specify that: *"wherein the camera's position and orientation is aligned with the eyes of a face displayed on the screen, such that the camera has the same view as the eyes of the face being displayed, wherein the optical axis of the camera is perpendicular to a viewing surface of the screen and wherein the optical axis of the camera intersects the screen in a point positioned between the eyes of the face, where the camera is moved to align eyes of the face with the camera"*.

This clarifies that aligning the camera with the eyes of a face shown on a screen means that the optical axis of the camera is perpendicular to the screen and intersects the screen in a point positioned between the eyes of the face.

- 2.2 In point 3.1 of its communication dated 20 May 2022, the board objected that the feature *"an optical axis of the camera is generally parallel with the viewing surface"* in dependent claim 3 of the version of auxiliary request IIb pending at that time contradicted the feature *"the optical axis of the camera is perpendicular to a viewing surface"* in claim 1 of the same request.

This issue has been resolved by the deletion of the feature objected to in dependent claim 3 of the main request.

- 2.3 In point 3.1 of its communication dated 20 May 2022, the board objected that dependent claim 4 of the version of auxiliary request IIb pending at that time was not clear because it specified a requirement for

positioning the camera which was possibly incompatible with the requirements for positioning the camera set out in claim 1.

This issue has now been resolved, because the main request no longer contains a dependent claim containing the subject-matter of dependent claim 4 of the version of auxiliary request IIb pending at that time.

2.4 In view of the above, the claims of the main request are clear (Article 84 EPC).

3. Main request - added subject-matter (Article 123(2) EPC)

3.1 All references to the application as filed cited in this decision refer to the published international application WO 2009/139995 A2.

3.2 Compared with claim 1 as originally filed, claim 1 of the main request contains the following amended features:

(a) *"where the screen includes a polymer stabilized cholesteric textured liquid crystal optical shutter"*

(b) *"where the sync system is configured to dynamically adjust a ratio of time the screen is in the transparent state relative to a time the screen is in the light-scattering state responsive to changes in an ambient brightness"*

(c) *"further comprising a face detection system configured to locate a face in the display image and align eyes of the face with the camera, wherein*

the camera's position and orientation is aligned with the eyes of a face displayed on the screen, such that the camera has the same view as the eyes of the face being displayed, wherein the optical axis of the camera is perpendicular to a viewing surface of the screen and wherein the optical axis of the camera intersects the screen in a point positioned between the eyes of the face, where the camera is moved to align eyes of the face with the camera"

Compared with claim 13 as originally filed, independent claim 5 of the main request contains the same amended features.

Feature (a) is based on original claim 2.

Feature (b) is based on original claim 7.

Feature (c) is based on original claims 5, 8 and 10, description paragraph [0015] and description paragraphs [0037] and [0038], in combination with Figures 1, 6 and 7.

3.3 The dependent claims of the main request have the following bases:

- claim 2: see original claim 3
- claim 3: see original claim 4 and paragraph [0018] of the description as originally filed
- claim 4: see original claim 12
- claim 6: see original claim 15
- claim 7: see original claim 20

3.4 Hence, the claims of the main request do not contain subject-matter extending beyond the content of the

application as filed and thus comply with Article 123(2) EPC.

4. Main request - inventive step (Article 56 EPC)
 - 4.1 The examining division identified document D1 as being the closest prior art for the assessment of inventive step of the subject-matter of the independent claims of the version of the main request pending at that time (see decision under appeal, points 1.1, 2.4 and 3). This was not contested by the appellant (see statement of grounds of appeal, page 2, second paragraph).
 - 4.2 However, the board considers document D5 to be a better starting point for the assessment of inventive step of the subject-matter of the independent claims of the present main request. The board finds that document D5 discloses the same features of the independent claims of the present main request as document D1 and further discloses features of the claimed sync system.
 - 4.3 Document D5 discloses a videoconferencing system (see Figure 1 and Figure 10(a)), comprising:

a screen selectively switchable between a substantially transparent state and a light scattering state (see Figure 1: "*light scattering/transparency control screen*" and section 2, third sentence: "*The first unit is a video projection screen that can be controlled either in a light-scattering state or a transparent state*");

a camera positioned to view a camera image traveling through the screen (see Figure 1: "*video camera with shutter*");

a projector positioned to project the display image at the screen (see Figure 1: "video projector");

a sync system (see Figure 1: "synchronizing circuits, driving circuits" and section 2, fifth sentence: "The fourth is a control circuit that contains driving circuits to control the screen and synchronizing circuits to adjust the driving signal and shutter signal of the video camera") configured to cause the screen to alternate between the substantially transparent state and the light-scattering state (see Figure 2: "screen response transparent opaque" and section 2, second paragraph, fourth sentence: "The driving circuits generate waveforms ... that cause the screen to alternate between the light-scattering state and the transparent state"), configured to cause the camera to view the camera image while the screen is in the substantially transparent state (see Figure 2: "camera shutterings open closed" and "screen response transparent opaque" and section 2, second paragraph, fifth sentence: "When the shutter time (T_1) is included in the time, the screen is transparent, and the camera can replicate the viewer's image"), and configured to cause the projector to project the display image while the screen is in the light-scattering state (see Figure 2: "projector works display ON display OFF" and section 2, last sentence of the second paragraph: "However, the viewer can see projected images because the translucent states are periodically repeated in the screen"),

where the sync system is configured to adjust a ratio of time the screen is in the transparent state relative to a time the screen is in the light-scattering state (see section 2, third paragraph: "Screen translucency depends on the ratio of shutter time to shutter period,

T_w/T₀ (duty factor). The smaller the duty factor, the more translucent the screen is and the better the displayed picture quality. On the other hand, the larger the duty factor, the larger the signal-to-noise ratio (SNR) of pictures taken by the camera.").

4.4 The subject-matter of claim 5 differs from the disclosure of document D5 in that the former specifies:

(a) that the screen includes a polymer stabilised cholesteric textured liquid crystal optical shutter

(b) a face detection system to locate a face in the display image and align eyes of the face with the camera, wherein the camera's position and orientation is aligned with the eyes of a face displayed on the screen, such that the camera has the same view as the eyes of the face being displayed, wherein the optical axis of the camera is perpendicular to a viewing surface of the screen and wherein the optical axis of the camera intersects the screen in a point positioned between the eyes of the face, where the camera is moved to align eyes of the face with the camera

and

(c) that the sync system is configured to adjust the ratio of time the screen is in the transparent state relative to the time the screen is in the light-scattering state dynamically and responsive to changes in an ambient brightness.

4.5 The board finds that these distinguishing features have the following technical effects.

A technical effect of distinguishing feature (a) is an increase in the brightness of the screen (in relation to a standard liquid crystal display as mentioned in document D5, Table 1).

The technical effect of distinguishing feature (b) is an adjustment of a position of the camera capturing an image of a local user of a videoconference.

The technical effect of distinguishing feature (c) is a maximisation of the display brightness while arriving at a sufficient signal-to-noise ratio of the captured images.

4.6 The board finds that the objective technical problems addressed by the distinguishing features are as follows:

- (a) how to increase the brightness of the screen
- (b) how to adjust a position of the camera capturing an image of a local user of a videoconference
- (c) how to maximise the display brightness while arriving at a sufficient signal-to-noise ratio of the captured images

4.7 According to the board, these are partial objective technical problems which would each have been separately addressed by the person skilled in the art (see Case Law of the Boards of Appeal of the European Patent Office, 9th edition 2019, I.D.9.2.2). This is because the first problem relates to properties of a screen, the second relates to positioning a camera and the third relates to digital signal processing.

4.8 The board finds that the person skilled in the art faced with the second partial objective technical problem would not have arrived at distinguishing feature (b) for the following reasons.

Document D3 discloses face detection but with the aim of identifying eyes in an image and shifting the position of the eyes in the image to create the impression of eye contact (see D3, column 3, line 14, to column 4, line 4). Document D3 does not teach adjusting a position of a camera capturing an image of a local user of a videoconference.

Document D7 discloses face detection to modify the appearance of an entire head to create the impression of eye contact (see D7, column 6, lines 7 to 33, and Figures 3A, 3B, 4A and 4B). Furthermore, D7 discloses extracting a part of a larger captured image to keep a videoconference user in the centre of a displayed image (see D7, column 6, line 34, to column 7, line 39, and Figure 5). Hence, document D7 teaches modifying an already-captured image rather than changing the manner in which the image is captured.

The board disagrees with the examining division's view that document D7 rendered the feature "*a face detection system to locate a face in the display image and align eyes of the face with the camera*" obvious (see point III. above).

Document D7 discloses identifying a face in an image captured by a camera. In other words, this is an image of a local user (see D7, column 6, lines 7 to 11, and column 6, line 68, to column 7, line 39). However, feature (b) under point 4.4 above relates to face detection to locate a face in the displayed image. This

image displays the face of a user at the other end of the videoconferencing system.

None of the other prior-art documents on file discloses feature (b) under point 4.4 above, nor does this feature belong to the common general knowledge of the person skilled in the art. The board finds that adjusting a camera position based on detecting a face of a user at the other end of a videoconferencing system provides a non-obvious alternative to the image manipulation known from the prior art.

4.9 Therefore, the subject-matter of claim 5 is not obvious in view of document D5 combined with any prior-art document on file or common general knowledge.

4.10 Claim 1 contains all of the features of claim 5 and additionally specifies the presence of a waveguide.

Hence, starting from document D5 as the closest prior art, the subject-matter of claim 1 is not obvious at least for the same reasons as those set out under points 4.3 to 4.9 above.

4.11 Moreover, the board sees no other combination of prior-art documents by which the person skilled in the art would have arrived at the subject-matter of the independent claims.

4.12 Claims 2 to 4 and 6 to 7 are dependent on claims 1 and 5, respectively. Hence, the subject-matter thereof is not rendered obvious by the available prior art either.

4.13 Therefore, the subject-matter of the claims of the main request is not obvious in view of the available prior art and thus meets the requirements of Article 56 EPC.

5. Main request- Rule 43(2)(c) EPC

Independent claims 1 and 5 both define a videoconferencing system and are thus in the same category.

However, claim 1 specifies an alternative configuration of the videoconferencing system including a waveguide. The presence of this waveguide requires the features of claim 1 specifying a projector and a camera to be formulated in a different manner than the corresponding features of claim 5. It is thus not appropriate to cover the alternative configurations with and without a waveguide by a single claim.

Hence, the exception set out under Rule 43(2)(c) EPC applies to claims 1 and 5 of the main request.

6. Main request - amended description

The description has been amended in line with the claims of the main request and complies with the EPC.

7. Conclusion

In view of the above, the current case is to be remitted to the examining division with the order to grant a patent on the basis of the appellant's main request.

Since the appellant's main request is allowed, the auxiliary requests need not be dealt with and the oral

proceedings requested by the appellant in the alternative was not necessary.

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 with the order to grant a patent in the following version:

Description:

Pages 1 to 13 and 15 as published

Pages 14 and 16 filed with the letter of 23 June 2022

Claims:

Nos. 1 to 7 filed with the letter of 23 June 2022

Drawings:

Sheets 1/4 to 4/4 as published

The Registrar:

The Chair:



K. Boelicke

B. Willems

Decision electronically authenticated