AMENDMENT TO THE SPECIFICATION

Please amend paragraph starting on page 31, line 25 as seen in the following marked-up paragraph:

A generic driver allows the client software 70 to transfer data to and receive data from a mass storage device 132 on the first peripheral device 130 via a USB interface 131. The client software 70 also has a USB endpoint 134 which can be a USB HID endpoint and if necessary, a vendor specific endpoint. This endpoint 134 is the endpoint for the client software 70 for transmitting the data for the display 126 to the base unit 100 where the data can be image processed (blocks 124, 125 of Figure 1) before being transmitted to the group 90 e.g. via an HDMI connection or similar. Thus, the HID endpoint 134 makes the HDMI display 126 and its audiovisual signals available to any processing device 160 with a first peripheral device attached thereto, when in a meeting room. However, the display 126 is not exposed on the processing device 160, i.e. it is not presented as a display but as an HID endpoint. The videocam 91 can be exposed on the first peripheral device 130 as an endpoint (in a way as described for Figure 1), the video data being encoded e.g. in block 122 of Figure 1. Alternatively, as shown in Figure 6, the video data is encoded in the base unit 100 and is sent via the first peripheral device 130 to a driver 162 of the operating system 164 of the processing device [[60]] 160 which exposes the encoded data from the videocam 91 on the processing device 160 and makes the video data available to the UC call, e.g. Skype™.

Please amend paragraph starting on page 34, line 25 as seen in the following marked-up paragraph:

In Figure 12 the processing device [[60']] 160' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith. The client software 70' can be adapted to simulate any of the embodiments described with respect to Figures 1 to 11 without however using a first peripheral device 130. The client software 70' can simulate

for example a UB interface of the type used in any of the embodiments of Figures 1 to 11. For the processing device [[160]] 160', the methods described with respect to any of Figures 1 to 11 can be used.

Please amend paragraph starting on page 35, line 1 as seen in the following marked-up paragraph

In Figure 13 the processing device [[60']] 160' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith exactly as described with respect to Figure 12. However, group 90 has a microphone and speaker combination such as a speakerphone 92 or a microphone and speaker combination 96, 97. Processing device [[160]] 160' can make use of any of the embodiments of Figures 1 to 11. The client software 70' of processing device 160' can be adapted to provide video data directly to the base unit 100 where it is processed, e.g. decoded and composited and provided to display 126 over a suitable connection such as an HDMI connection.

Please amend paragraph starting on page 35, line 19 as seen in the following marked-up paragraph

In Figure 14 the processing device [[60']] 160' has no first peripheral device 130, e.g. none is available. In such a case client software 70' can be adapted to interact directly with base unit 100 over a wireless connection 127' and the client software 70' is adapted to provide any simulations, or translations as required to present the display device 126 to the processing unit 160' and to allow interaction therewith exactly as described with respect to Figure 13. However, group 90 has a videocam 91 connected e.g. via a USB connection to the base unit 100. Processing device [[160]] 160' can make use of any of the embodiments of Figures 1 to 11. The client software 70' of processing device 160' can be adapted to receive video data directly from the base unit 100.

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-57. (Cancelled)

58. (Currently Amended) A system for connecting a processing device to a functional device connected to or in a base unit of a wireless connection, the system comprising:

the base unit having a transmitter,

a first display device connected to or in the base unit,

at least one functional device connected to or in the base unit, and

the processing device having a memory, a second display device, an operating system, a third party software for a Unified Communication call, a driver and a client software, when executed on the processing device, is configured to have the processing device interact directly with the base unit over a wireless connection,

wherein the base unit, via the transmitter, is configured to transmit data over the wireless connection to the processing device,

wherein the client software, when executed by a processor of the processing device, is configured to provide any simulations or translations, as required, to allow interaction between the first display device and the processing device, and wherein the client software and the driver, when executed on the processing device, are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, and the third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call, the processing device being configured to host the Unified Communication between two or more other processing devices.

59. (Previously Presented) The system of claim 58, wherein the client software and the driver are configured to present a simulated speakerphone to the operating system to create a virtual microphone and a virtual speaker.

60. (Previously Presented) The system of claim 58, wherein the client software and the driver are configured to present a simulated videocam to the operating system to create a virtual videocam device.

61. (Previously Presented) The system of claim 58, wherein the client software is configured to provide video data, optionally obtained by screen scraping, directly to the base unit, wherein the base unit processes the video data.

62. (Previously Presented) The system of claim 58, wherein the processing device processes video data received from the base unit via the transmitter over the wireless connection.

63. (Previously Presented) The system of claim 62, wherein processing of the video data comprises decoding and compositing or decrypting the video data.

64. (Previously Presented) The system of claim 58, wherein the at least one functional device which is presented to the operating system as a virtual functional device, is one or more of a data capturing device, a microphone, a speakerphone, a speaker, another display, a touchscreen, a projector, a camera, a video camera, and a webcamera.

65. (Previously Presented) The system of claim 58, further comprising means for encoding, optionally encrypting the data in the base unit or the processing device.

66. (Previously Presented) The system of claim 58, wherein the virtual functional device is presented to the unified communication between the two or more other processing devices.

67. (Cancelled)

68. (Previously Presented) The system of claim 58, further comprising at least one fixed or a configurable endpoint of the virtual functional device, wherein the at least one fixed or a configurable endpoint is a data source or a data sink which is configured to store or emit data of the virtual functional device.

69. (Currently Amended) A method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the base unit having a transmitter and a first display device, the processing device having a memory, a second display device and an operating system, a third party software for a Unified Communication call, and a driver and a client software wherein, the client software, when executed by a processor on the processing device:

interacts directly with the base unit over a wireless connection and provides any simulations or translations, as required, to allow interaction between the first display device and the processing device, wherein the base unit transmits data over the wireless connection to the processing device,

the client software and a driver, when executed on the processing device, present the functional device to the operating system of the processing device as a virtual functional device,

third party software for a Unified Communication call is presented with the virtual functional device which it then uses for the call,

wherein the processing device hosts the Unified Communication call between two or more processing devices.

70. (Previously Presented) The method of claim 69, wherein the client software and the driver present a simulated speakerphone to the operating system thus creating a virtual microphone and a virtual speaker.

71. (Previously Presented) The method of claim 69, wherein the client software and a driver present a simulated videocam to the operating system thus creating a virtual videocam device.

72. (Previously Presented) The method of claim 69, wherein the client software of processing device provides video data, optionally obtained by screen scraping, directly to the base unit where it is processed.

73. (Previously Presented) The method of claim 72, wherein the process comprises decoding and compositing or decrypting the video data and providing the video data to the first display device.

74. (Previously Presented) The method of claim 69, wherein the functional device which is presented to the operating system as the virtual functional device is any one or more of a data capturing device, a microphone, a speakerphone, a speaker, another display, a touchscreen, a projector, a camera, a video camera, a webcamera.

75. (Previously Presented) The method of claim 69, further comprising encoding, optionally encrypting the data.

76. (Previously Presented) The method of claim 69, wherein the virtual functional device is presented to the unified communication between the two or more other processing devices.

77. (Previously Presented) The method of claim 69, further exposing a same type of functional device to the processing device as is connected to the base unit which is presented to the operating system as a virtual functional device.

78. (Previously Presented) The method of claim 69, further comprising at least one fixed or a configurable endpoint of the virtual functional device, wherein the at least one fixed or a configurable endpoint is a data source or a data sink which stores or emits data of the virtual functional device.

79. (Previously Presented) The method of claim 70, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device.

80. (Cancelled)

81. (New) The system of claim 58, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device.

REMARKS

Applicant respectfully requests favorable reconsideration of this application in view of the above amendments and the following remarks.

The specification is amended to address the objection as pointed out in the Office Action.

Claims 58 and 69 are amended. Support for the amendments may be found, for example, at least on page 34, lines 25-29 of the specification as originally filed.

Claims 67 and 80 are cancelled without prejudice or disclaimer.

Claim 81 is added. Support for the claim may be found, for example, at least in claim 79 as previously presented.

No new matter has been added.

Claims 58-66, 68-79, and 81 are pending.

Objection to the Specification

The specification has been objected to for informalities. The specification has been amended to address the objection. Applicant requests reconsideration and withdrawal of this objection.

Claim Interpretation

Claim 65 is interpreted under 35 U.S.C. § 112(f) as including means-plus-function language. Applicant does not concede the correctness of this interpretation and defers the filing of any interpretation until it is necessary at a later time.

Claim Rejections - 35 U.S.C. § 103

Claims 58-80 are rejected under 35 U.S.C. 103 as being unpatentable over Brands et al. (U.S. Patent Application Publication No. 2015/0121466) ("Brands") in view of Beel et al. (U.S. Patent Application Publication No. 2015/0169477) ("Beel"). Applicant respectfully traverses the rejection. Without acquiescing to the merits of the rejection, but in order to advance prosecution independent claims 58 and 69 have been amended. While claims 58 and 69 differ in scope, claim 58 is discussed below with respect to the features that are commonly recited in the claims.

Claim 58 recites, at least in part, that:

> the client software, when executed by a processor of the processing device, is configured to provide any simulations or translations, as required, to allow interaction between the first display device and the processing device, and wherein the client software and the driver, when executed on the processing device are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, and the third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call, the processing device being configured to host the Unified Communication between two or more other processing devices.

As such, the features recited in the claims are at least directed to at least the following aspects in parallel: 1) providing any simulations or translations to allow interaction between the first display device and the processing device and 2) presenting the at least one functional device to the operating system of the processing device as a virtual functional device.

Neither Brands nor Beel, taken alone or in combination, teaches or suggests the same combination of features as recited in claim 58.

As admitted on page 8 of the Office Action, "Brands does not specifically disclose presenting a functional device as a virtual functional device to the processing device." Rather, Brands at least teaches in paragraph [0127] that the "communication network 50 is adapted to receive arbitrary media content from at least one of the plurality of processing devices 31 and to transmit the arbitrary media content of at least one of the plurality of processing devices to the central display device 44." As such, even assuming, but not admitting that Brands teaches that the connection unit may be integrated into a user processing device, there is no teaching in Brands of client software that is specifically configured such to provide any simulations or translations, as required, to allow interaction between the first display device and the processing device, and wherein the client software and the driver, when executed on the processing device are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, and the third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call, the processing device being configured to host the Unified Communication between two or more other processing devices.

Beel fails to cure the deficiencies of Brands with respect to claim 58. Rather, Beel at least teaches in paragraph [0313] the following:

> On the peripheral device in embodiment of the present invention one can implement a virtual audio device. This peripheral device can present itself as an audio out device to

> the processing device Such as a laptop, PDA, laptop, Smartphone, tablet, PC, etc it is connected to. As soon as the peripheral device is plugged in, the user of the processing device will see an additional audio out interface displayed on the processing device display to which it can stream the audio. Audio configuration advantageously can be done using the standard audio interface GUI on the processing device. The peripheral device can present itself as a USB composite device.

As such, Beel teaches a specific arrangement in which the peripheral device presents itself as an audio out device, but fails to disclose or suggest the combination of features as recited in claim 58, as presented above.

That is, while it is suggested on pages 8-9 of the Office Action that Beel teaches the previously presented features, Applicant respectfully disagrees and further submits that Beel fails to disclose or suggest the features as recited in amended claim 58. Rather, one having ordinary skill in the art would have understood that in Beel, the peripheral device is presented as the virtual audio device to the processing device, e.g., the endpoint for the audio out device is on the peripheral device. On the other hand, the features recited in claim 58 are clearly directed to the client software and the driver, when executed on the processing device, are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device. That is, in claim 58, the presentation of the at least one functional device is at the operating system level, such that, for example, the endpoint for the functional device may be presented to the operating system for registration on the processing device, e.g., the endpoint being on the processing device. There is no indication in Beel, however, that the audio out device would have been presented to the operating system of the processing device without using the peripheral device, e.g., the end point for the audio device being on processing device instead of on the peripheral device.

Therefore, since neither Brands nor Beel, taken alone or in combination, teaches or suggests all of the features as recited in claim 58, the proposed modification of the invention of Brands in accordance with Beel fails to result in the same combination of features as recited in claim 58.

Moreover, there is no teaching or suggestion in Brands or Beel that would have prompted one having ordinary skill in the art to have combined the teachings of the cited references to result in the same combination of features as recited in claim 58. Rather, Brands and Beel are directed to different combination of features to overcome their respective prior art deficiencies.

For example, Brands is directed mainly to the use of a peripheral device, e.g., plugged into a processing device, for communication between the processing device and the base unit; whereas, Beel is at least directed to the peripheral device presenting itself as an audio out device to the processing device. As such, there is no teaching or suggestion in either Brands or Beel that would have prompted or led one having ordinary skill in the art to result in the same combination of features as recited in claim 58.

Rather, only through the present disclosure is one having ordinary skill in the art taught of the specific combination of features such that the client software, when executed by a processor of the processing device, is configured to provide any simulations or translations, as required, to allow interaction between the first display device and the processing device, and the client software and the driver, when executed on the processing device, are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, and the third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call. As such, not only is the client software configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, the third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call. Thus, one having ordinary skill in the art would have understood that the features recited in the claims are also at least directed to virtual functional devices, e.g., driver installed on PC 160, virtual microphone and speaker and in which the generation and exposure of the endpoints are on the virtual functional device, e.g., virtual USB endpoints, enumerate USB endpoints, load drivers to endpoints, etc. Thus, no peripheral device, which may require presentation of the peripheral device to the processing device, even when integrated into a user processing device, is required for the implementation of the features of claim 58 and the operation of the virtual functional device is at the operating system level of the processing device to allow full control to transfer the virtual device for the Unified Communication call, which is not taught or suggested in Brands or Beel.

Therefore, since neither Brands nor Beel, taken alone or in combination, teaches or suggests the same combination of features as recited in amended claim 58, obviousness of claim 58 cannot be established.

For at least the foregoing remarks, claim 58 is patentable over Brands and Beel. Claim 69 recites similar features as recited in claim 58 and is patentable over Brands and Beel for at least the same reasons as amended claim 58. The remaining claims depend on claims 58 and 69 and are patentable over Brands and Beel for at least the same reasons as claims 58 and 69. Applicant is not conceding the correctness of the rejection of the features not discussed herein. Applicant respectfully requests reconsideration and withdrawal of this rejection.

In view of the above, Applicant respectfully requests favorable reconsideration in the form of a Notice of Allowance. If any questions arise regarding this communication, the Examiner is invited to contact Applicant's representative listed below. Please charge any additional fees or credit any overpayment to Deposit Account No. 50-3478.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 S. 7th St., Suite 2700
Minneapolis, MN 55402
(612) 455-3800

Dated: January 27, 2023

By: _____/Thomas Lee/_____
Thomas Lee
Reg. No.: 66,396
TL/ajs

Electronic Patent Application Fee Transmittal

Application Number:	16771068
Filing Date:	09-Jun-2020
Title of Invention:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
First Named Inventor/Applicant Name:	Gauthier RENARD
Filer:	Thomas Lee/Jessica Sun
Attorney Docket Number:	21063.0018USWO

Filed as Large Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1480	1480
Miscellaneous:				
			Total in USD ($)	**1480**

Electronic Acknowledgement Receipt

EFS ID:	47439719
Application Number:	16771068
International Application Number:	
Confirmation Number:	1088
Title of Invention:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS
First Named Inventor/Applicant Name:	Gauthier RENARD
Customer Number:	52835
Filer:	Thomas Lee/Jessica Sun
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	21063.0018USWO
Receipt Date:	27-JAN-2023
Filing Date:	09-JUN-2020
Time Stamp:	13:27:04
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1480
RAM confirmation Number	E20231QD27463084
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Warnings:					
Information:					
2		Response_0018.pdf	116124 7447219512021d2ddbe59096c20cb6c92c3b8081	yes	12

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Request for Reconsideration-After Non-Final Rejection	1	1
Specification	2	3
Claims	4	7
Applicant Arguments/Remarks Made in an Amendment	8	12

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38964 35c969fb1071a1ad40b4c1a9a7bff37228845162	no	2
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National Stage of an International Application under 35 U.S.C. 371

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PTO/AIA/22 (12-22)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): 21063.0018USWO

Application Number: 16/771068

Filed: June 9, 2020

For: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Art Unit: 2186

Examiner: MISIURA, BRIAN T.

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$220	$88	$44	$
☐ Two months (37 CFR 1.17(a)(2))	$640	$256	$128	$
☑ Three months (37 CFR 1.17(a)(3))	$1,480	$592	$296	$ 1480
☐ Four months (37 CFR 1.17(a)(4))	$2,320	$928	$464	$
☐ Five months (37 CFR 1.17(a)(5))	$3,160	$1,264	$632	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-3478.

☑ Payment made via USPTO's patent electronic filing system (Patent Center or EFS-Web).

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I am the

☐ applicant.

☑ attorney or agent of record. Registration number 66,396.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Thomas Lee/ — Signature

January 27, 2023 — Date

Thomas Lee — Typed or printed name

612-455-3800 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of _____ forms are submitted.

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PTO/SB/08a (01-22)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA, BRIAN THOMAS
Attorney Docket Number	21063.0018USWO

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	1	2008011727	WO	A1	2008-01-31			

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USWO

	1	ICRON WiRanger Cable USB 2.0 Hub User Guide, by Icron Technologies Corporation, www.icron.com	
	2	Observations by a third party in European Application No. 18833045.0, dated February 17, 2023	
	3	Office Action issued in European Application No. 18833045.0, dated February 1, 2023	
	4	Office Action in Chinese Application No. 201880084464.1, dated January 19, 2023, with machine translation	X

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**03/08/2023 06:02:18 PM ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	61711259	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
FR1_WO2008011727.pdf	70	Foreign Reference	3171 KB
NPL1-WiRanger.pdf	28	Non Patent Literature	1169 KB
NPL2_3rd_Party_Observation.pdf	4	Non Patent Literature	136 KB
NPL3_OA3_EP.pdf	5	Other reference-Patent/Application/Search Documents	152 KB
NPL4_OA2_CN.pdf	20	Other reference-	9511 KB

		Patent/Application/Search Documents	
SB08_0018USWO.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

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FR1_WO2008011727.pdf	354BC4CC498AC4251501CBB6A58541A58E3235995BE2624898D2588B8F9A1BE6BDAFAD4E2E20E8F159769FD8710C47E3DB245E9DED5C8E025EA63284EDE9089E
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NPL3_OA3_EP.pdf	6659AF636CA066FF509EBADB791333F39AE93FC293DDD2116F55052C65C2BF5D2A079769CA21FE98957F52B16B83C6BB89E01F6114BC0764BF582547CE5EA591
NPL4_OA2_CN.pdf	E5B098DB84099EFE59D90B6C23FD85C483D31BAE312168F2FCE123D222F64934A1D4C5171C3AB97B3F9F0DA473D8F4F0FB65F7016CA15A26D42A055597B2ECDA
SB08_0018USWO.pdf	47201EA26FBB211940BE50BAD29AD503D8466D8FBA3AC1ED127D53B152893899AF6F080C9412A4969FC245C832963526164 4B3A61F9B2A0D4AC81FC738A20738

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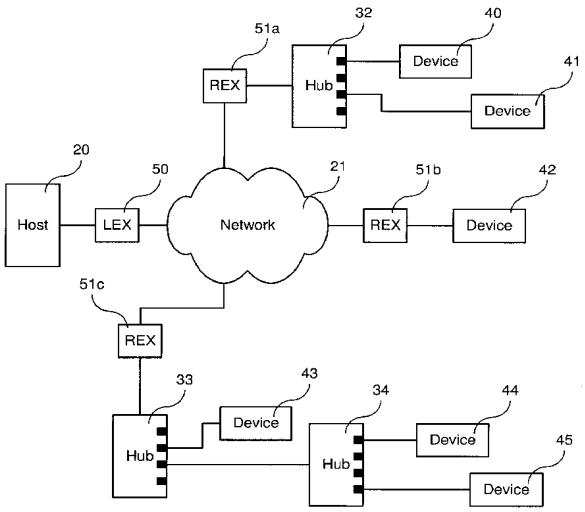
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(54) Title: METHOD AND APPARATUS FOR DISTRIBUTING USB HUB FUNCTIONS ACROSS A NETWORK



(57) Abstract: A method and related apparatuses for data transmission between a host computer and one or a plurality of USB compliant peripheral devices over a data communications network is provided which operates in the presence of transmission delays greater than that normally allowed in the USB specification. The host computer is connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through the data communications network. The remote extender devices are, in turn, connected to a plurality of conventional USB peripheral devices. Data between the host computer and peripheral devices is stored and processed in the local and remote extender devices in order to allow the host computer and the USB peripheral devices to operate with greater than normally allowed time delays. In particular, the invention is of most utility when the round-trip transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

WO 2008/011727 A1

METHOD AND APPARATUS FOR DISTRIBUTING USB HUB FUNCTIONS ACROSS A NETWORK

Field of the Invention

This invention relates to methods and apparatus for transmitting signals between computers and devices using Universal Serial Bus (USB) ports, and, in particular, to a method for operating a plurality of USB peripheral devices distributed across a data communications network.

Description of the Prior Art

Universal Serial Bus (USB) is a technology designed to permit a wide range of peripherals to be attached to personal computers by the average user. The technology supports all of the common peripheral devices such as keyboards, mice, speakers, joysticks, cameras, flash drives, hard drives, DVD drives and many others, and its use in current computers is common.

USB was created by an alliance of seven of the largest companies in the computer and communication markets. Those companies were Intel, Compaq, Microsoft, NorTel, NEC, Digital and IBM. The specifications defining USB (e.g. Intel et al., Universal Serial Bus Specification, Revision 1.0, January 1996; and updated as Revision 1.1 in Sep. 23, 1998, and further updated as Revision 2.0 in April 2000, and subsequent updates, additions and modifications --hereinafter collectively referred to as the "USB Specification", which term can include future modifications and revisions) are non-proprietary and are managed by an open

industry organization known as the USB Implementers Forum (USB-IF). The USB Specification establishes a number of criteria which must be met in order to comply with USB standards. The USB Specification also defines a number of terms, which definitions are adopted for the purposes of this specification.

Under the USB specification, data communication is managed by a USB host controller unit installed, preferably, in a host computer. Furthermore, said data communication occurs in a series of USB transactions wherein each USB transaction is initiated by a USB host controller and is composed of one, two or three subactions. Each subaction is terminated by a reversal in the direction of data flow.

Of most relevance to the present invention, however, is the feature that all known USB Specifications currently limit the distance that a device can be separated from its host computer to a maximum of 5 meters. By using a series of USB Hubs--devices that are intended to support increased populations rather than increased distances--this distance limitation can be increased, in theory, to 30 meters. However, this multiple hub solution is both expensive and clumsy.

In US Patent No. 6381666, the contents of which are incorporated herein by reference, a method and apparatus for extending the distance between a host computer and a peripheral device, is provided which increased the useable distance to 100 meters or more. While this approach has been beneficial, it would still be desirable to provide alternative and/or improved methods and apparatus for achieving this same effect.

The major factor that limits the extent to which the range of USB can be extended is transmission delay. The USB Specification allows a maximum period of approximately 1.5 microseconds for the round-trip delay of a single communication from a host computer to a device and back to the computer. The round-trip delay budget of 1.5 microseconds is composed of two approximately equal parts, namely, the transmission delay in both directions between the host computer and the device and secondly, the turn-around time required by the device to create the desired response. The approach described in US Patent No. 6381666 removed this restriction on the upper limit of round-trip delay.

While the approach described in US Patent No. 6381666 made it possible to operate USB peripheral devices over an extended distance and in the presence of long transmission

delays, it did not describe a configuration in which a plurality of USB peripheral devices are widely separated from each other. Although a requirement to widely separate USB peripheral devices controlled by a single host computer can be accommodated by utilizing multiple instantiations of the approach described in US Patent No. 6381666, it would be beneficial to devise a more flexible and cost-effective approach.

Of further relevance to the present invention is the feature that all known USB Specifications currently require that a USB hub be employed whenever multiple USB peripheral devices are required to be connected simultaneously to a single port on a USB host controller. It is an attribute of a USB hub that said hub be equipped with a single upstream port for connecting to a USB host controller (or upstream hub) and a plurality of downstream ports for connecting to a plurality of USB peripheral devices (or downstream hubs). The USB driver software resident in the host computer that contains the USB host controller is aware of the connection topology of USB hubs and USB peripheral devices and will fail to operate if said topology is not maintained.

Thus it has been demonstrated that supporting a plurality of USB peripheral devices from a single USB host controller requires that a USB hub be connected between said USB peripheral devices and said USB host controller and that said USB hub must be equipped with an individual downstream port for each USB peripheral device. However, if it is desired to insert a data communications network between said USB hub and said USB peripheral devices, then it would be advantageous to concentrate all USB traffic travelling between said USB hub and said data communications network over a single physical connection.

Of yet further relevance to the present invention is the feature that all known USB Specifications currently require that each downstream port of a USB hub supports control and monitoring of the physical connection between said downstream port and any USB peripheral device that may be connected thereto. In particular, said downstream port must be able to detect the connection and disconnection of a USB peripheral device, and must be able to reset, suspend and resume the operation of said USB peripheral device. It would be advantageous to maintain said connection, disconnection, reset, suspend and resume capabilities normally associated with individual physical connections when said individual physical connections are replaced by a shared connection to a data communications network.

Summary of the Invention

Accordingly, while the range extending USB technology, as described in US 6381666 has proven to be useful in point-to-point configurations, it would still be desirable to provide improvements to the technology by providing an improved method and apparatus for enabling a plurality of peripheral devices, utilizing the USB specification, to be distributed at various locations across a network, wherein said network may exhibit long transmission delays.

Therefore, it is an objective of the present invention to provide methods and apparatus to enable a plurality of USB peripheral devices to be connected through a virtual USB hub to a host computer equipped with a USB host controller.

It is a further object of the present invention that the functions of said virtual USB hub may be distributed across a data communications network.

It is a further object of the present invention that said host computer may be connected to said data communications network through a single physical connection.

It is a further object of the present invention that said data communications network may exhibit transmission delays that exceed the parameters defined by the USB Specification.

It is a further object of the present invention that said plurality of USB peripheral devices and said USB host controller may operate at any of the data rates permitted under the USB 2.0 Specification.

It is a further object of the present invention that a virtual USB peripheral device may be connected to said virtual USB hub.

It is a further object of the present invention that no hardware or software changes need be made to the existing host computers, hubs and devices supported by the system and operating under the USB protocol. The invention, thereby, may be incorporated into networks composed of both conventional delay and extended delay devices.

It is a further object of the present invention that no prior knowledge of the arrangement of said plurality of USB peripheral devices with respect to said data communications network be required.

It is a further object of the present invention that the USB device management functions of connection, disconnection, reset, suspend and resume shall operate consistent with the prior art USB specifications when the prior art physical connections are replaced by a network connection as described by the present invention.

It is a further object of the present invention that the apparatus be very cost effective, consistent with the broadest population of devices targeted by the USB industry.

These and other objects of the invention, which will become apparent herein, are fully or at least partially attained by the present invention which invention provides a method and related apparatuses, wherein a host computer is connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through a data communications network. The remote extender devices are, in turn, connected to a plurality of conventional USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of transmission delays greater than that normally allowed in the USB specification. In particular, the invention is of most utility when the round-trip transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

Accordingly, in a first aspect, the present invention provides a computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising a host computer connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through a data communications network and which, in turn, are connected to a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed in the USB specification.

Preferably, the round-trip delay comprises a transmission delay and a turn-around time delay, and wherein said transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

As such, the present invention provides a computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices wherein said USB peripheral devices may be distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising:

a) a host computer for generating and accepting USB subactions;

b) one or a plurality of USB peripheral devices capable of responding to USB subactions initiated by said host computer;

c) a local extender unit connected to said host computer for forwarding USB subactions from said host computer to a data communications network, and for forwarding USB subactions received from said data communications network to said host computer;

d) one or a plurality of remote extender units each of which is connected to one or a plurality of USB peripheral devices, for forwarding USB subactions received from said data communications network to said USB peripheral devices, and for forwarding USB subactions received from said USB peripheral devices to said data communications network;

e) a data communications network for forwarding USB subactions from said local extender unit to said remote extender units, and for forwarding USB subactions from said remote extender units to said local extender unit;

f) means in said local extender unit for forwarding a USB subaction received from said host computer to said remote extender unit over said data communications network, and for generating and sending a generated USB subaction to said host computer;

g) means in said remote extender unit for forwarding said USB subaction received from said host computer to one or a plurality of USB peripheral devices, and for receiving a subaction received from a USB peripheral device;

h) means in said remote extender unit for forwarding said subaction received from a USB peripheral device to said local extender unit over said data communications network;

i) means in said remote extender unit for generating a USB subaction in confirmation of a USB subaction received from a USB peripheral device and sending said generated confirm USB subaction to said USB peripheral device;

j) means in said remote extender unit for generating a USB subaction in response to a USB subaction received from said host computer and sending said generated response USB subaction to said local extender unit;

k) means in said local extender unit for receiving and identifying when a sequence of inbound USB subactions received from said remote extender unit over said data communications network are related to a common outbound USB subaction;

l) means in said local extender unit for storing an inbound USB subaction from said remote extender unit until such inbound USB subaction is again requested by said host computer; and

m) means in said local extender unit for forwarding said stored USB subaction to said host computer.

The computer system also preferably comprises:

a) means, preferably in said local extender unit, for absorbing replicated USB subactions;

b) means in said remote extender unit for assembling a sequence of USB subactions into an atomic USB subaction and preferably sending said atomic USB subaction to said USB peripheral device; and

c) means in said remote extender unit for disassembling an atomic USB subaction into a sequence of discrete USB subactions and preferably sending said sequence of discrete USB subactions to said local extender unit.

In a further aspect, the present invention also provides a local extender apparatus for transmitting USB traffic between a host computer and a data communications network, in a computer system as described hereinabove with respect to the present invention, wherein said

USB traffic may be addressed to a plurality of USB peripheral devices, said apparatus comprising:

a) a USB transceiver for connecting to said host computer;

b) an upstream-facing port for controlling said USB transceiver;

c) a local repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a memory unit for storing USB subactions during processing by said apparatus;

e) a local router unit for providing a network address for USB subactions moving in a downstream (host to network) direction;

f) a network transceiver for connecting to said data communications network;

g) a hub controller unit for responding to subactions generated by said host computer regarding the status of said plurality of USB peripheral devices;

h) means for instantiating a plurality of virtual ports for managing the status of said plurality of USB peripheral devices;

i) means for instantiating a plurality of virtual USB devices for providing value-added functions;

j) means in said local repeater for identifying USB subactions addressed to said hub controller;

k) means in said local repeater for identifying USB subactions addressed to said plurality of virtual USB devices;

l) means in said plurality of instantiated virtual ports for maintaining the status of said plurality of USB peripheral devices;

m) means in said plurality of instantiated virtual ports for receiving device status change signals from said data communications network and updating the status of said plurality of USB peripheral devices; and

n) means in said hub controller for receiving device management commands from said host computer and sending device management signals to said data communications network.

In a further aspect, the present invention also provides a remote extender apparatus for transmitting USB subactions between a data communications network and a USB peripheral device, in a computer system as described hereinabove with respect to the present invention, said apparatus comprising:

a) a network transceiver for connecting to said data communications network;

b) a remote router unit for providing a network address for USB subactions moving in an upstream (network to host) direction;

c) a remote repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a transaction translator unit for converting between high-speed split transactions and full-speed/low-speed atomic transactions;

e) a memory unit for storing USB subactions during processing by said apparatus;

f) a USB transceiver for connecting to said USB peripheral device;

g) a downstream-facing port for controlling said USB transceiver;

h) means in said remote router unit for identifying split transactions;

i) means in said downstream port controller for detecting the status of said USB peripheral device;

j) means in said downstream port controller for generating device status signals and sending said signals to said data communications network;

k) means in said downstream port controller for receiving device management signals from said data communications network; and

l) means in said downstream port controller for changing the status of said USB peripheral device.

To operate, the system preferably includes means for, and the ability to detect the attachment of a USB peripheral device to the system, to detect the detachment of a USB peripheral device, and to determine the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device.

As such, in a further aspect, the present invention provides a method for detecting the attachment of a USB peripheral device, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device attachment event, having said remote extender send a device connect signal to said local extender, and then having said local extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said local record of connected status to said host computer;

f) receiving at said local extender a command from said host computer to reset said USB peripheral device, having said local extender send a reset signal to said remote extender,

and then having said remote extender perform a physical reset on said USB peripheral device;

g) detecting at said remote extender the transmission speed of said USB peripheral device, having said remote extender send a speed signal to said local extender, and then having said local extender update its local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device;

h) receiving at said local extender a further request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

i) receiving at said local extender a yet further request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device to said host computer;

j) receiving at said local extender a request from said host computer to clear said change in reset status information and having said local extender clear said local record of the change in reset status information; and

k) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in reset status to said host computer.

In a further aspect, the present invention provides a method for detecting the detachment of a USB peripheral device, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device detachment event, having said remote extender send a device disconnect signal to said local extender, and then having said local extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a request from said host computer to clear the enabled status information of said USB peripheral device and having said local extender clear its local record of enabled status information; and

f) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said cleared local record of enabled status to said host computer.

In a further aspect, the present invention provides a method for determining the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device, and wherein a plurality of said USB functions may be distributed around a data communications network, and wherein a USB address is allocated to each USB function by a host computer, which method comprises:

a) building a data record for each first USB function connected directly or indirectly to said network and identifying each record by a unique USB address assigned dynamically by said host computer;

b) recording within said data record the USB address of the upstream USB hub to which said first USB function is connected;

c) recording within said data record the port number of the upstream USB hub to which said first USB function is connected;

d) recording within said data record the USB address of each downstream USB function connected directly to said first USB function;

e) recording within said data record the port number of said first USB function to which each downstream USB function is connected; and

f) recording the network address assigned to said first USB function.

In a further aspect, the present invention also provides a method for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said method comprising connecting a host computer to a local extender device, connecting said local extender device to one or a plurality of remote extender devices through a data communication network, and connecting said remote extender devices to one or a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed by the USB specification.

In more detail, the present invention provides a method for transmitting a USB command from a host computer, through a local extender, to a unique network address on a data communications network, which method comprises:

a) receiving at a local extender a USB command from a host computer;

b) extracting a first USB address from said USB command;

c) using said first USB address to access a first data record within a table of similar records;

d) determining whether said first data record contains a valid network address;

e) extracting from said first data record a second USB address identifying the upstream USB hub through which said first USB address may be accessed;

f) repeating steps (c) through (e) until a valid network address is found;

g) encapsulating said USB command in a network packet;

h) addressing said network packet to said valid network address; and

i) transmitting said addressed network packet to said data communications network.

In a further aspect, the present invention provides a method for conducting asynchronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session, having said local extender forward said first request across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first request from said remote extender;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further request from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender generate a positive acknowledgement response to said USB peripheral device, and then having said remote extender forward said data transfer response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a data transfer response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded data transfer response from said remote extender and having said local extender store said forwarded data transfer response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded data transfer response, and then having said local extender forward said retrieved data transfer response to said host computer.

In a further aspect, the present invention provides a method for conducting asynchronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a first notification from said host computer for the start of a split data transfer session, having said local extender forward said first notification across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent notification from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first notification from said remote extender;

c) receiving at a remote extender said forwarded first notification for the start of a split data transfer session, having said remote extender convert said forwarded notification for the start of a split data transfer session into a classic-speed notification for data transfer, and then having said remote extender forward said classic-speed notification for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further notification from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a positive acknowledgement response from said USB peripheral device and having said remote extender forward said positive acknowledgement response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a positive acknowledgement response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded positive acknowledgement response from said remote extender and having said local extender store said forwarded positive acknowledgement response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer.

In a further aspect, the present invention provides a method for conducting isochronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session and having said local extender forward said first request for the start of a split data transfer session across a network to said remote extender;

b) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a complete sequence of split data transfer responses, and then having said local extender generate a null data response to said host computer;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender convert said received data transfer response into a sequence of split data transfer responses, and then having said remote extender forward said sequence of split data transfer responses across a network to said local extender;

e) receiving at a local extender said forwarded sequence of split data transfer responses from said remote extender and having said local extender store said forwarded sequence of split data transfer responses in local memory;

f) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender forward said subsequent request across a network to said remote extender; and

g) receiving at a local extender a sequence of subsequent requests for completion of a split data transfer session, having said local extender check local memory for the presence of a complete sequence of split data transfer responses, and then having said local extender retrieve said sequence of split data responses from memory and forward said sequence of split data responses to said host computer.

In a further aspect, the present invention provides a method for conducting isochronous data transactions, preferably over a data communications network in which the round-trip delay exceeds 1 microsecond, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a notification from said host computer for the start of a split data transfer session, having said local extender forward said notification for the start of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the start of a split data transfer session in local memory;

b) receiving at a local extender a first notification from said host computer for the continuation of a split data transfer session, having said local extender forward said first notification for the continuation of a split data transfer session across a network to said remote extender, and then having said remote extender store said first notification for the continuation of a split data transfer session in local memory;

c) receiving at a local extender a further notification from said host computer for the continuation of a split data transfer session, having said local extender forward said further notification for the continuation of a split data transfer session across a network to said remote extender, and then having said remote extender store said further notification for the continuation of a split data transfer session in local memory;

d) receiving at a local extender a notification from said host computer for the completion of a split data transfer session, having said local extender forward said notification for the completion of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the completion of a split data transfer session in local memory;

e) assembling at a remote extender said stored notification for the start of a split data transfer, said stored first notification for the continuation of a split data transfer, said stored further notification for the continuation of a split data transfer and said stored notification for the completion of a split data transfer session into a classic-speed notification of data transfer; and

f) having said remote extender forward said classic-speed notification of data transfer to said USB peripheral device.

Description of the Preferred Embodiments

In a preferred embodiment, the host computer and the USB peripheral device can be any standard unit or device that supports the USB Specification. Preferably, no modifications to either the hardware or the software of said host computer are required.

The local extender is preferably a self-contained unit that connects to said host computer through a standard USB cable.

The remote extender is preferably a self-contained unit that connects to said plurality of USB peripheral devices through a plurality of standard USB cables.

The data communications network is not limited to any particular transmission media or protocol, but can, in operation, introduce a round-trip transmission delay between said host computer and said plurality of USB peripheral devices in excess of 1 microsecond. It is a necessary attribute of said data communications network that it provide a communications path between at least one local extender unit and at least one remote extender unit. It is preferable that said data communications network provide a communications path between at least one local extender unit and a plurality of remote extender units (a point-to-multipoint configuration). Networks such as those based on wired Ethernet, wireless Ethernet, IEEE 802.15.3, and the Internet are, for example, compliant with these requirements.

The methods and apparatuses of the present invention are most preferably used in a system wherein said host computer is a personal computer, and said plurality of USB peripheral devices are comprised of USB flash drives, USB hard drives, USB CD/DVD drives, USB cameras, USB mice, USB keyboards, USB hubs or any other device which is compatible with the USB Specification.

In a preferred embodiment of a local extender unit, the local extender includes an upstream transceiver and a downstream transceiver, and the upstream transceiver is a standard USB transceiver and the downstream transceiver is a wireless transceiver.

In a further preferred embodiment of a local extender unit, the upstream transceiver is a standard USB transceiver and the downstream transceiver is an Ethernet transceiver.

In a preferred embodiment of a remote extender unit, the remote extender includes an upstream transceiver and a downstream transceiver, and the upstream transceiver is a wireless transceiver and the downstream transceiver is a standard USB transceiver.

In a further preferred embodiment of a remote extender unit, the upstream transceiver is an Ethernet transceiver and the downstream transceiver is a standard USB transceiver.

Brief Description of the Drawings

The novel features which are believed to be characteristic of the present invention, as to its structure, organization, use and method of operation, together with further objectives and advantages thereof, will be better understood from the following drawings in which a presently preferred embodiment of the invention will now be illustrated by way of example. It is expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention. Embodiments of this invention will now be described by way of example in association with the accompanying drawings in which:

Figure 1 is a block diagram of a typical system topology according to the USB specification;

Figure 2 is a block diagram of a corresponding system topology according to the invention;

Figure 3 is a block diagram of a hub according to the USB specification;

Figure 4 is a block diagram showing the distribution of USB hub functions across a network according to the invention;

Figure 5 is a timing diagram of typical USB transactions according to the prior art USB Specifications;

Figure 6 is a block diagram of a local extender unit according to the invention;

Figure 7 is a block diagram of a remote extender unit according to the invention;

Figure 8 is a sequence diagram showing the handling of a connect event according to the invention;

Figure 9 is a sequence diagram showing the handling of a disconnect event according to the invention;

Figure 10 is a table recording the topology of a system configured according to the invention;

Figure 11 is a sequence diagram showing the handling of a split asynchronous IN transaction according to the invention;

Figure 12 is a sequence diagram showing the handling of a split asynchronous OUT transaction according to the invention;

Figure 13 is a sequence diagram showing the handling of a split isochronous IN transaction according to the invention; and

Figure 14 is a sequence diagram showing the handling of a split isochronous OUT transaction according to the invention;.

Detailed Description of the Invention

Figure 1 is a block diagram of a prior art system assembled according to the USB Specifications. According to the USB Specifications, a USB-enabled computer (20) may be connected to a plurality of USB devices (40 - 45) through a USB hub (31) and through a chain of USB hubs (31 and 32, and 31 to 34). A device cannot be connected to another device and the

maximum number of hubs that can be connected in a single serial chain is five. The maximum length of each cable used to interconnect a computer, hub or device is 5 metres.

Figure 2 is a block diagram of a system for communicating with USB devices across a network, according to the present invention.

In this arrangement, USB subactions, including input/output operations for host computer (20) are intercepted by a local extender (50) which is connected to said host computer through a standard USB cable. The local extender (50) preferably generates a "modified" form of the USB protocol that is delivered over network (21) to a plurality of remote extenders (51a, 51b, 51c) which can be located at an extended distance from said local extender (50). Hubs 32, and 33, and device 42 are connected to remote extenders 51a, 51b, and 51c, as previously described.

In this embodiment of the present invention, a host computer (20), and a local extender (50) are assembled as individual units. It will be apparent to those skilled in the art though that different combinations of these components might be used and that alternative packaging arrangements are possible.

Each remote extender (51a, 51b, 51c) receives signals from the network (21) and then, if necessary, preferably converts the received signals to electrical signals compatible with the USB protocol and delivers these electrical signals over USB cables to directly connected USB hubs (32, 33) and USB peripheral device (42). Signals are relayed to indirectly connected USB peripheral devices (40, 41, 43, 44, 45) and to indirectly connected USB hub (34) by USB hubs (32, 33). The reverse process occurs when signals are passed from USB peripheral devices (40-45) to host computer (20).

Again, in this embodiment of the present invention, a remote extender (51b) and a USB peripheral device (42) are assembled as individual units. It will be apparent to those skilled in the art though that different combinations of these components might be used and that alternative packaging arrangements are possible.

Also, in this embodiment of the present invention, a remote extender (51a) and a USB hub (32) are assembled as individual units. It will again be apparent to those skilled in the art

that different combinations of these components might be used and that alternative packaging arrangements are possible.

Further, in this embodiment of the present invention, a particular arrangement of three remote extenders, three remote hubs and six USB peripheral devices has been chosen. It will clearly be apparent to those skilled in the art that different populations of these hubs and devices might be used and that alternative connection arrangements are possible.

In this embodiment of the present invention, the data communications network (21) is a wired Ethernet network and the round-trip delay between host computer (20) and USB peripheral device (42) can be up to, for example, 1 millisecond or more. In other embodiments, however, the data communications network can be changed. For example, in another embodiment of the invention, the data communications network (21) can be a wireless network and the round-trip delay between host computer (20) and USB peripheral device (42) can be up to, for example, 100 milliseconds or more. In a further embodiment of the invention, the data communications network (21) can be an internet connection and the round-trip delay between host computer (20) and USB peripheral device (42) can be up to, for example, 1 second or more.

As such, it will be apparent to those skilled in the art that different data communications networks might be used, and that the corresponding round-trip delays may change accordingly.

Figure 3 is a block diagram of a prior art USB hub assembled according to the USB specification. Said USB hub is equipped with an upstream port (60) for communicating with a host computer or upstream hub, and a plurality of downstream ports (65a, 65b, 65c) for communicating with a plurality of USB devices or downstream USB hubs.

A USB subaction arriving at upstream port (60) is forwarded to hub repeater (62) which determines whether said USB subaction can be forwarded directly to one of the downstream ports (65a, 65b, 65c) or must be directed towards transaction translator (61) or hub controller (63). A USB subaction that must be converted from high-speed format to classic-speed format is directed towards transaction translator (61). A USB subaction that relates to the internal operation of the hub is directed towards hub controller (63). A USB subaction that relates to the status of the USB peripheral devices that are directly connected to downstream ports (65a, 65b, 65c) is directed towards hub controller (63).

A USB subaction that arrives at transaction translator (61) from hub repeater (62) is converted from high-speed to classic-speed format by said transaction translator (61) and then forwarded to the appropriate downstream port (65a, 65b or 65c) through routing logic (64).

In the upstream direction, a high-speed USB subaction arriving at any downstream port (65a, 65b or 65c) is forwarded by routing logic (64) to hub repeater (62) which in turn forwards said high-speed USB subaction to upstream port (60). A classic-speed USB subaction arriving at downstream port (65a, 65b or 65c) is forwarded by routing logic (64) to transaction translator (61) where said classic-speed USB subaction is converted to high-speed USB format before being forwarded to hub repeater (62) and thereafter to upstream port (60).

The number of upstream ports is typically one, but the number of downstream ports can vary from 1 to 255, and is not limited to the three ports shown.

Figure 4 is a block diagram showing the distribution of USB hub functions across a network according to the present invention. The following description will describe the operation of the invention with respect to remote extender (51b) for illustration of the method but it will be clear to those skilled in the art that a similar description applies to remote extenders (51a) and (51c) and that additional remote extenders may be deployed beyond the three units shown in Figure 4, up to the maximum number of ports allowed for a USB hub (e.g. currently to a maximum of 255 ports).

In this arrangement of the present invention, the upstream port (60) and hub controller (63) are located within the local extender (50). The hub repeater function (62) from Figure 3 for providing connectivity between the remaining hub functions, is duplicated as a local repeater (71) within local extender (50), and as a remote repeater (75b) in remote extender (51b).

The transaction translator (61) from Figure 3 is located within remote extender (51b) as transaction translator (61b). The downstream port (65b) from Figure 3 is located within remote extender (51b) as downstream port (65b).

The routing logic (64) from Figure 3 is replaced by a local router (72) in local extender (50) and a remote router (74b) in remote extender (51b). Whereas in a conventional USB hub, routing logic (64) is required to direct traffic to a specific port (65a, 65b or 65c), in the present

invention the replacement logic (72 and 74b) is required to direct traffic to a specific network node that identifies remote extenders (51a, 51b or 51c) or local extender (50).

The functionality of hub controller (63) is enhanced by the addition of virtual ports (73a, 73b, 73c), wherein said virtual ports provide to said hub controller (63) a local mechanism for maintaining the status of physical downstream ports (65a, 65b, 65c). In this arrangement, each local virtual port (e.g. 73b) provides local emulation of its corresponding remote physical port (e.g. 65b), enabling hub controller (63) to operate on a local resource (73b) while said virtual port (73b) is responsible for relaying operations to remote physical port (65b). A similar process occurs in the opposite direction when a physical event occurring at remote physical port (65b) is relayed to corresponding local virtual port (73b) and said local virtual port (73b) is then responsible for informing hub controller (63) of said physical event.

Figure 5 is a timing diagram of typical USB transactions according to the prior art USB Specifications.

A USB transaction consists of one, two or three phases, in which a phase is terminated by a reversal in the direction of data flow. Each phase can contain zero, one or more discrete USB packets. The set of packets that comprise a single phase is described herein as a USB subaction.

In the examples shown in Figure 5, transaction #1 occupies three phases and is an example of an IN command addressed to an asynchronous endpoint. Transaction #2 occupies one phase and is an example of an OUT command addressed to an isochronous endpoint. Transactions #3, #6 and #8 occupy two phases and are examples of OUT commands addressed to asynchronous endpoints.

Additional transactions #4 and #5 also occupy two phases and are further examples of IN commands addressed to asynchronous endpoints. Transaction #7 occupies three phases and is an example of an IN command addressed to a low-speed asynchronous endpoint.

Figure 6 is an enhanced block diagram of a local extender unit (50) according to the invention. A particular enhancement included in said local extender unit (50) is the addition of virtual device controller (83). Said virtual device controller (83) can be configured to emulate the operation of a physical USB device or devices and can thereby be used to add value-added

features to said local extender unit (50). In one embodiment of the present invention said virtual device controller (83) emulates a radio management function and can be used to control the physical parameters of network transceiver (84). In another embodiment of the present invention said virtual device controller (83) emulates a network interface card and can be used to transmit TCP/IP packets across data communications network (21). It will be apparent to those skilled in the art that these functions are not unique and that other functions may be performed in a similar manner.

In a first mode of operation, a USB subaction originating from host computer (20) is received by USB transceiver (81) and forwarded through upstream port (60) to local repeater (71). The content of said USB subaction is examined by local repeater (71) and forwarded as required.

If said USB subaction is addressed to virtual USB hub (31), then said USB subaction is forwarded to hub controller (63). If said USB subaction is addressed to a USB peripheral device (40-45) or physical USB hub (32-34), then said USB subaction is forwarded to local router (72). If said USB subaction is addressed to a virtual USB device, then said USB subaction is forwarded to virtual device controller (83).

If a response to said USB subaction is already present in local memory (82), as described herein below, then said response is retrieved from memory by local repeater (71) and forwarded to USB transceiver (81) through upstream port (60). If a synthetic response to said USB subaction is required, then said synthetic response is generated by local repeater (71) and forwarded to USB transceiver (81) through upstream port (60).

When a USB subaction is forwarded by local repeater (71) to local router (72), the USB address contained in said USB command is examined by said local router (72) and translated to a network address. Said local router (72) encapsulates said USB subaction in a network packet, addresses said network packet with said translated network address and forwards said addressed network packet to network transceiver (84) for transmission across said network (21) to remote extender (51b).

In a second mode of operation, an addressed network packet from said remote extender (51b) is received by network transceiver (84) and forwarded to local router (72). Said local router (72) extracts a USB subaction from said addressed network packet, examines the content

of said USB subaction, and forwards said USB subaction to local repeater (71). If said content represents a USB response subaction, then said USB response subaction is stored in local memory (82) for later transmission to the USB transceiver, as discussed hereinabove, in response to a USB command subaction. If said content represents a system subaction indicating a change in status of USB device (42) directly connected to said remote extender (51b), then said system subaction is forwarded to hub controller (63). Hub controller (63) examines the content of said forwarded system subaction and updates the status of virtual port #2 (73b).

Figure 7 is an enhanced block diagram of a remote extender unit (51) according to the invention. In this arrangement, the operation of said remote extender unit (51) is activated by a stimulus occurring at either network transceiver (91) or USB transceiver (92). Where a specific scenario is required, the following description will use remote extender (51b) for illustration of the method but it will be clear to those skilled in the art that a similar description applies to remote extenders (51a) and (51c) and that additional remote extenders may be deployed beyond the three units shown in Figure 4.

In accordance with the USB specifications, transactions that require the use of a transaction translator are described as split transactions. Accordingly, transactions that do not require the use of said transaction translator will be described herein as atomic transactions.

In a first mode of operation, an addressed network packet is received by network transceiver (91) and forwarded to remote router (74). Said remote router (74) extracts a USB subaction from said addressed network packet, examines the content of said USB subaction, and forwards said USB subaction to remote repeater (75). If said content represents a USB subaction indicating a split transaction, then said USB subaction is forwarded to transaction translator (61). If said content represents a USB subaction indicating an atomic (non-split) USB transaction, then said USB subaction is forwarded to USB transceiver (92) through downstream port controller (65). If said content represents a system subaction, then said system subaction is forwarded to remote controller (93).

In a second mode of operation, a USB subaction is received from USB peripheral device (42) by USB transceiver (92) and forwarded through downstream port controller (65) to remote repeater (75). Said remote repeater (75) examines the content of said USB subaction and optionally generates a USB confirm subaction for transmission to said USB peripheral

device (42) through downstream port controller (65) and USB transceiver (92). Also, if said content of said USB subaction indicates an atomic USB transaction, then said USB subaction is forwarded to remote router (74). Further, if said content of said USB subaction indicates a classic-speed USB transaction, then said USB subaction is forwarded to transaction translator (61) for conversion to high-speed split transaction format. Said converted USB subaction is then forwarded through remote repeater (75) to remote router (74).

When remote router (74) receives a USB subaction from remote repeater (75), said remote router (74) encapsulates said USB subaction in a network packet, addresses said network packet with the network address of local extender (50) and forwards said addressed network packet to network transceiver (91) for transmission over data communications network (21).

In a third mode of operation, a change in the status of USB peripheral device (42) is detected by downstream port controller (65) through USB transceiver (92) and reported to remote controller (93). In response to said reported change in status, said remote controller generates a system subaction and forwards said system subaction to remote repeater (75) for transmission to local extender (50).

Figure 8 is a sequence diagram showing the handling of a connect event according to the invention. The presentation format used in the diagram is attributable to Jacobson et al. (Ivar Jacobson, Magnus Christerson, Patrick Jonsson and Gunnar Overgaard, Object-Oriented Software Engineering: A Use Case Driven Approach, Addison-Wesley, 1992.). For illustration purposes, it will be assumed that said sequence diagram describes the attachment of USB peripheral device (42) to remote extender (51b), and that remote extender (51b) is assigned to virtual port #2 (73b) on hub controller (63). It will be apparent to those skilled in the art that the same process can be applied to the attachment of any USB peripheral device or any USB hub to any remote extender and that further virtual ports can be assigned as required..

The connection sequence begins in section "A". On power-up, in accordance with standard USB protocols, control logic (104) in USB peripheral device (42) drives a static J/K value on its USB data lines. Said static J/K value is detected by control logic (103) in remote extender (51b) and transmitted as a connect subaction across network (21) to local extender

(50). Control logic (101) in local extender (50) updates the status of the corresponding virtual port (73b) and reports said change of status event to host computer (20).

Control logic (100) in host computer (20) then requests the status of port #2, and control logic (101) in local extender (50) replies with a device connected indication.

Subsequently, in section "B", control logic (100) in host computer (20) issues a command to clear the change in connection status indicator belonging to port #2, and then requests confirmation that said command has been completed by issuing a further request for the status of port #2. Control logic (101) in local extender (50) clears said change in connection status indicator belonging to port #2, and reports that no further changes in status are outstanding. This operation completes the physical attachment sequence.

Thereafter, in section "C", control logic (100) in host computer (20) initiates a device reset sequence by generating a USB command to reset the device attached to port #2. Control logic (101) in local extender (50) translates said USB command into a reset subaction and transmits said reset subaction across network (21) to remote extender (51b). Control logic (103) in remote extender (51b) receives said transmitted reset subaction and drives a reset condition (SE0) on the data lines of downstream port (65b). After transmitting the reset condition for a period of time determined by the USB specification, said remote extender (51b) establishes the speed of operation of said USB peripheral device (42), and transmits said speed of operation as a speed subaction across network (21) to said local extender (50). Control logic (101) in local extender (50) updates the status of the corresponding virtual port and reports said change of status event to host computer (20).

Control logic (100) in host computer (20) then requests the status of port #2, and control logic (101) in local extender (50) replies with a reset complete plus speed indication.

Subsequently, in section "D", control logic (100) in host computer (20) issues a command to clear the change in reset status indicator belonging to port #2, and then requests confirmation that said command has been completed by issuing a further request for the status of port #2. Control logic (101) in local extender (50) clears said change in reset status indicator belonging to virtual port #2 (73b), and reports that no further changes in status are outstanding. This operation completes the device reset sequence.

Figure 9 is a sequence diagram showing the handling of a disconnect event according to the invention. For illustration purposes, it will be assumed that said sequence diagram describes the detachment of USB peripheral device (42) from remote extender (51b), and that remote extender (51b) is assigned to virtual port #2 (73b) on hub controller (63). It will be apparent to those skilled in the art that the same process can be applied to the detachment of any USB peripheral device or any USB hub from any remote extender and that further virtual ports can be assigned as required.

The disconnection sequence begins in section "A". On device detachment, control logic (104) in USB peripheral device (42) ceases to drive a static J/K value on its USB data lines. Said cessation of driving a static J/K value is detected by control logic (103) in remote extender (51b) and transmitted as a disconnect subaction across network (21) to local extender (50). Control logic (101) in local extender (50) updates the status of the corresponding virtual port and reports said change of status event to host computer (20).

Control logic (100) in host computer (20) then requests the status of port #2, and control logic (101) in local extender (50) replies with a device disconnected indication.

Subsequently, in section "B", control logic (100) in host computer (20) issues a command to clear the change in connection status indicator belonging to port #2, and then issues a further command to clear the enabled status of port #2. Control logic (100) in host computer (20) then requests confirmation that said commands have been completed by issuing a further request for the status of port #2. Control logic (101) in local extender (50) clears said change in connection status indicator and said enabled status belonging to virtual port #2 (73b), and reports that no further changes in status are outstanding. This operation completes the physical detachment sequence.

Figure 10 is a table recording the topology of a system configured according to the invention.

The data presented in said table provides a method by which the example topology presented in Figure 2 can be mapped. In turn, the topology of the current invention illustrated in Figure 2 is required to emulate the topology of the prior art system illustrated in Figure 1. The device column records the USB address of each device and hub contained in Figure 2. For clarity, the USB address is set identical to the numbering of the blocks in Figure 2. It will be

apparent to those skilled in the art that this association is not essential and that any USB address in the range 1 - 127 may be allocated by host computer (20).

A special case is presented by USB hub (31). In Figure 1, said USB hub (31) is a physical unit and is allocated USB address 31. In Figure 2, said USB hub is a virtual unit created by the combined operations of local extender (50), remote extenders (51a, 51b and 51c) and network (21). In order to emulate the operation of said physical USB hub (31), said virtual hub is also allocated USB address 31.

The parent/address column records the USB address of the upstream hub to which a device or hub is connected. The parent/port column records the port number of the upstream hub to which a device or hub is connected. The child/port # columns record the USB address of the downstream device or hub connected to said port number. The number of child/port # columns shown in the table is four which enables a maximum of four remote extender units to be incorporated in the system. It will be apparent to those skilled in the art that this value is not unique and that currently any value in the range from 1 to 255 can be chosen, thereby enabling the maximum number of remote extender units to also fall within the range 1 to 255.

The network address column records the network address of the network node to which a device or hub is directly connected.

The operation of said table will be further described by selecting particular examples. A special case is presented by USB hub (31) which is connected to host computer (20) and acts as the root of the USB topology. In Figure 2, said USB hub (31) is implemented as a virtual hub by the functions distributed in extenders (50, 51a, 51b and 51c) and in particular by hub controller (63) in local extender (50). Said USB hub (31) appears as device (31) in said table. Since USB hub (31) forms the root of the system it has no parent within the system and the value of its parent address and port number is set to null. The child entries for said USB hub (31) show that USB hub (32) is connected to its port #1, USB peripheral device (42) is connected to its port #2 and USB hub (33) is connected to its port #4. The network entry for said USB hub (31) shows that it is connected to network node (N0). It will be apparent to those skilled in the art that value (N0) is representational and that any other value may be used that is appropriate to the network chosen to provide data communications between said local and remote extenders. For example, if said data communications network is an Ethernet network

then said network entry would be an Ethernet address. If said data communications network is an Internet network then said network entry would be an IP address.

The entry for USB hub (34) in said table shows that its parent is port #3 on USB hub (33), that USB peripheral device (44) is connected to its port #1, that USB peripheral device (45) is connected to its port #4, and that said USB hub (34) is not directly connected to network (21). The network address to be used for USB hub (34) is then found by tracing its connectivity back through its parent or parent's parent. In the case of USB hub (34), its parent is USB hub (33) and the network address of said USB hub (33) is (N3). In this manner, the chaining of USB hubs according to the USB Specification is accommodated by the present invention.

The entry for USB peripheral device (42) shows that its parent is port #2 on USB hub (31) and that it is directly connected to network (21) at node (N2).

Figure 11 is a sequence diagram showing the handling of a split asynchronous IN transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a first start-split IN command to local extender (50). Control logic (101) responds to said first start-split IN command by transmitting a negative response subaction to said host computer (20), and then forwards said first start-split IN command to remote extender (51b) across network (21). Control logic (101) continues to generate negative response subactions whenever a subsequent start-split IN command is received from host computer (20) and no response has been received from remote extender (51b).

Control logic (103) in remote extender (51b) receives said first start-split IN command from network (21), converts said start-split IN command into a classic-speed IN command, and then forwards said classic-speed IN command to USB peripheral device (42). Also, control logic (103) in remote extender (51b) transmits a positive response subaction across network (21) to local extender (50) where said positive response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further start-split IN command, control logic (101) in local extender (50) retrieves said positive response subaction from local memory and forwards said retrieved positive response subaction to host computer (20). Control logic (100) in host computer (20) then issues a complete-split IN command and control logic (101) in local extender (50) replies with a not-yet response.

Meanwhile, control logic (104) in USB peripheral device (42) generates a classic-speed DATA0/1 response and forwards said response to remote extender (51b). Control logic (103) in remote extender (51b) generates a classic-speed confirm subaction and forwards said subaction to USB peripheral device (42). Also, control logic (103) in remote extender (51b) forwards said DATA0/1 response across network (21) to local extender (50) where said DATA0/1 response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further complete-split IN command, control logic (101) in local extender (50) retrieves said DATA0/1 response subaction from local memory and forwards said retrieved DATA0/1 response subaction to host computer (20).

Figure 12 is a sequence diagram showing the handling of a split asynchronous OUT transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a first start-split OUT/DATA0/1 command to local extender (50). Control logic (101) responds to said first start-split OUT/DATA0/1 command by transmitting a negative response subaction to said host computer (20), and then forwards said first start-split OUT/DATA0/1 command to remote extender (51b) across network (21). Control logic (101) continues to generate negative response subactions whenever a subsequent start-split OUT/DATA0/1command is received from host computer (20) and no response has been received from remote extender (51b).

Control logic (103) in remote extender (51b) receives said first start-split OUT/DATA0/1 command from network (21), converts said start-split OUT/DATA0/1 command into a classic-speed OUT/DATA0/1 command, and then forwards said classic-speed OUT/DATA0/1 command to USB peripheral device (42). Also, control logic (103) in remote extender (51b) transmits a positive response subaction across network (21) to local extender (50) where said positive response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further start-split OUT/DATA0/1 command, control logic (101) in local extender (50) retrieves said positive response subaction from local memory and forwards said retrieved positive response subaction to host computer (20). Control logic (100) in host computer (20) then issues a complete-split OUT command and control logic (101) in local extender (50) replies with a not-yet response.

Meanwhile, control logic (104) in USB peripheral device (42) generates a classic-speed positive response subaction and forwards said subaction to remote extender (51b). Control logic (103) in remote extender (51b) forwards said positive response subaction across network (21) to local extender (50) where said positive response subaction is stored in local memory. When control logic (100) in host computer (20) issues a further complete-split OUT command, control logic (101) in local extender (50) retrieves said positive response subaction from local memory and forwards said retrieved positive response subaction to host computer (20).

Figure 13 is a sequence diagram showing the handling of a split isochronous IN transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a first start-split IN command to local extender (50). Control logic (101) in local extender (50) forwards said first start-split IN command to remote extender (51b) across network (21). Control logic (103) in remote extender (51b) receives said first start-split IN command from network (21), converts said start-split IN command into a classic-speed IN command, and then forwards said classic-speed IN command to USB peripheral device (42). After a delay, control logic (100) in host computer (20) transmits a complete-split IN command to local extender (50) and control logic (101) in local extender (50) replies with a null-data response. Control logic (101) continues to generate null-data responses whenever a subsequent complete-split IN command is received from host computer (20) and a DATA0 response has not been received from remote extender (51b).

Meanwhile, control logic (104) in USB peripheral device (42) generates a classic-speed DATA0 response and forwards said response to remote extender (51b). Control logic (103) in remote extender (51b) converts said classic-speed DATA0 response into a sequence of high-speed MDATA/DATA0 responses and forwards said responses across network (21) to local extender (50) where said MDATA/DATA0 responses are stored in local memory. When control logic (100) in host computer (20) issues a further sequence of complete-split IN commands, control logic (101) in local extender (50) retrieves said MDATA/DATA0 responses from local memory and forwards said retrieved MDATA/DATA0 responses to host computer (20).

Figure 14 is a sequence diagram showing the handling of a split isochronous OUT transaction according to the invention.

Control logic (100) in host computer (20) initiates said transaction by issuing a start-split-begin OUT/DATA0 command to local extender (50). Control logic (101) in local extender (50) forwards said start-split-begin OUT/DATA0 command to remote extender (51b) across network (21).

Control logic (100) in host computer (20) continues said transaction by issuing one or more start-split-mid OUT/DATA0 commands to local extender (50). Control logic (101) in local extender (50) forwards each start-split-mid OUT/DATA0 command to remote extender (51b) across network (21).

Control logic (100) in host computer (20) completes said transaction by issuing a start-split-end OUT/DATA0 command to local extender (50). Control logic (101) in local extender (50) forwards said start-split-end OUT/DATA0 command to remote extender (51b) across network (21).

When control logic (103) in remote extender (51b) receives said start-split-end OUT/DATA0 command, said control logic (103) assembles said start-split-begin OUT/DATA0 command, said one or more start-split-mid OUT/DATA0 commands and said start-split-end OUT/DATA0 command into a classic-speed OUT/DATA0 command and forwards said command to USB peripheral device (42).

Thus, it is apparent that there has been provided, in accordance with the present invention, methods, systems and/or USB-related devices which fully, or at least partially, satisfy the means, objects, and advantages over the prior art as set forth hereinbefore. Therefore, having described specific embodiments of the present invention, it will be understood that alternatives, modifications and variations thereof may be suggested to those skilled in the art, and that it is intended that the present specification embrace all such alternatives, modifications and variations as fall within the scope of the appended claims.

Additionally, for clarity and unless otherwise stated, the word "comprise" and variations of the word such as "comprising" and "comprises", when used in the description and

claims of the present specification, is not intended to exclude other additives, components, integers or steps.

Claims

1. A computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising a host computer connected to a local extender device which, in turn, is connected to one or a plurality of remote extender devices through a data communications network and which, in turn, are connected to a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed in the USB specification.

2. A computer system as claimed in Claim 1 wherein said round-trip delay comprises a transmission delay and a turn-around time delay, and wherein said transmission delay between the host computer and the USB peripheral device exceeds 1 microsecond.

3. A computer system as claimed in Claim 1 wherein said host computer is a computer that supports the USB Specification.

4. A computer system as claimed in Claim 1 wherein said plurality of USB peripheral devices are comprised of USB flash drives, USB hard drives, USB CD/DVD drives, USB cameras, USB mice, USB keyboards, USB hubs or any other device which is compatible with the USB Specifications.

5. A computer system for transmitting data between a host computer and one or a plurality of USB peripheral devices as claimed in Claim 1 wherein said USB peripheral devices

may be distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said computer system comprising:

a) a host computer for generating and accepting USB subactions;

b) one or a plurality of USB peripheral devices capable of responding to USB subactions initiated by said host computer;

c) a local extender unit connected to said host computer for forwarding USB subactions from said host computer to a data communications network, and for forwarding USB subactions received from said data communications network to said host computer;

d) one or a plurality of remote extender units each of which is connected to one or a plurality of USB peripheral devices, for forwarding USB subactions received from said data communications network to said USB peripheral devices, and for forwarding USB subactions received from said USB peripheral devices to said data communications network;

e) a data communications network for forwarding USB subactions from said local extender unit to said remote extender units, and for forwarding USB subactions from said remote extender units to said local extender unit;

f) means in said local extender unit for forwarding a USB subaction received from said host computer to said remote extender unit over said data communications network, and for generating and sending a generated USB subaction to said host computer;

g) means in said remote extender unit for forwarding said USB subaction received from said host computer to one or a plurality of USB peripheral devices, and for receiving a subaction received from a USB peripheral device;

h) means in said remote extender unit for forwarding said subaction received from a USB peripheral device to said local extender unit over said data communications network;

i) means in said remote extender unit for generating a USB subaction in confirmation of a USB subaction received from a USB peripheral device and sending said generated confirm USB subaction to said USB peripheral device;

j) means in said remote extender unit for generating a USB subaction in response to a USB subaction received from said host computer and sending said generated response USB subaction to said local extender unit;

k) means in said local extender unit for receiving and identifying when a sequence of inbound USB subactions received from said remote extender unit over said data communications network are related to a common outbound USB subaction;

l) means in said local extender unit for storing an inbound USB subaction from said remote extender unit until such inbound USB subaction is again requested by said host computer; and

m) means in said local extender unit for forwarding said stored USB subaction to said host computer.

6. A computer system as claimed in Claim 5 additionally comprising

a) means, preferably in said local extender unit, for absorbing replicated USB subactions;

b) means in said remote extender unit for assembling a sequence of USB subactions into an atomic USB subaction and preferably sending said atomic USB subaction to said USB peripheral device; and

c) means in said remote extender unit for disassembling an atomic USB subaction into a sequence of discrete USB subactions and preferably sending said sequence of discrete USB subactions to said local extender unit.

7. A local extender apparatus for use in transmitting USB traffic between a host computer and a data communications network wherein said USB traffic may be addressed to a plurality of USB peripheral devices, said apparatus comprising:

a) a USB transceiver for connecting to said host computer;

b) an upstream-facing port for controlling said USB transceiver;

c) a local repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a memory unit for storing USB subactions during processing by said apparatus;

e) a local router unit for providing a network address for USB subactions moving in a downstream (host to network) direction;

f) a network transceiver for connecting to said data communications network;

g) a hub controller unit for responding to subactions generated by said host computer regarding the status of said plurality of USB peripheral devices;

h) means for instantiating a plurality of virtual ports for managing the status of said plurality of USB peripheral devices;

i) means for instantiating a plurality of virtual USB devices for providing value-added functions;

j) means in said local repeater for identifying USB subactions addressed to said hub controller;

k) means in said local repeater for identifying USB subactions addressed to said plurality of virtual USB devices;

l) means in said plurality of instantiated virtual ports for maintaining the status of said plurality of USB peripheral devices;

m) means in said plurality of instantiated virtual ports for receiving device status change signals from said data communications network and updating the status of said plurality of USB peripheral devices; and

n) means in said hub controller for receiving device management commands from said host computer and sending device management signals to said data communications network.

8. A local extender as claimed in Claim 7 wherein said USB transceiver is a standard USB transceiver and said network transceiver is a wireless transceiver.

9. A local extender as claimed in Claim 7 wherein said USB transceiver is a standard USB transceiver and said network transceiver is an ethernet transceiver.

10. A local extender as claimed in Claim 7 wherein said local extender is a self-contained unit that connects to said host computer through a standard USB cable.

11. A remote extender apparatus for use in transmitting USB traffic between a data communications network and at least one USB peripheral device, said apparatus comprising:

a) a network transceiver for connecting to said data communications network;

b) a remote router unit for providing a network address for USB subactions moving in an upstream (network to host) direction;

c) a remote repeater unit for regenerating USB subactions passing through said apparatus and for switching USB subactions between the components of said apparatus;

d) a transaction translator unit for converting between high-speed split transactions and full-speed/low-speed atomic transactions;

e) a memory unit for storing USB subactions during processing by said apparatus;

f) a USB transceiver for connecting to said USB peripheral device;

g) a downstream-facing port for controlling said USB transceiver;

h) means in said remote router unit for identifying split transactions;

i) means in said downstream port controller for detecting the status of said USB peripheral device;

j) means in said downstream port controller for generating device status signals and sending said signals to said data communications network;

k) means in said downstream port controller for receiving device management signals from said data communications network; and

l) means in said downstream port controller for changing the status of said USB peripheral device.

12. A remote extender as claimed in Claim 11 wherein said network transceiver is a wireless transceiver and said USB transceiver is a standard USB transceiver.

13. A remote extender as claimed in Claim 11 wherein said network transceiver is an ethernet transceiver and said USB transceiver is a standard USB transceiver.

14. A remote extender as claimed in Claim 11 wherein said remote extender is a self-contained unit that connects to said plurality of USB peripheral devices through a plurality of standard USB cables.

15. A method for transmitting data between a host computer and one or a plurality of USB peripheral devices, wherein said USB peripheral devices are distributed around a data communications network and wherein the transmission delay across said network is greater than that normally allowed by the USB specification, said method comprising connecting a host computer to a local extender device, connecting said local extender device to one or a plurality of remote extender devices through a data communication network, and connecting said remote extender devices to one or a plurality of USB peripheral devices, wherein signals between said host computer and said USB peripheral devices are saved, collected, absorbed, or otherwise processed in the local extender and/or the remote extenders so as to allow the host computer and the USB peripheral devices to operate in the presence of a round trip delay greater than that normally allowed in the USB specification.

16. A method as claimed in Claim 15 wherein said method includes the ability to detect the attachment of a USB peripheral device to the system, to detect the detachment of a

USB peripheral device, and/or the ability to determine the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device.

17. A method as claimed in Claim 16 for detecting the attachment of a USB peripheral device by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device attachment event, having said remote extender send a device connect signal to said local extender, and then having said local extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said local record of connected status to said host computer;

f) receiving at said local extender a command from said host computer to reset said USB peripheral device, having said local extender send a reset signal to said remote extender, and then having said remote extender perform a physical reset on said USB peripheral device;

g) detecting at said remote extender the transmission speed of said USB peripheral device, having said remote extender send a speed signal to said local extender, and then having said local extender update its local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device;

h) receiving at said local extender a further request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

i) receiving at said local extender a yet further request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the transmission speed of said USB peripheral device and its local record of the change in reset status of said USB peripheral device to said host computer;

j) receiving at said local extender a request from said host computer to clear said change in reset status information and having said local extender clear said local record of the change in reset status information; and

k) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in reset status to said host computer.

18. A method as claimed in Claim 17 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

19. A method as claimed in Claim 16 for detecting the detachment of a USB peripheral device by a host computer, wherein said host computer and said USB peripheral device conform to the requirements of the USB Specification, through a local extender and a remote extender, which method comprises:

a) detecting at said remote extender a device detachment event, having said remote extender send a device disconnect signal to said local extender, and then having said local

extender update its local record of the change in connection status of said USB peripheral device and its local record of the connected status of said USB peripheral device;

b) receiving at said local extender a request from said host computer for device status change information and having said local extender inform said host computer that the status of said USB peripheral device has changed;

c) receiving at said local extender a request from said host computer for the status of said USB peripheral device and having said local extender provide said local record of the change in connection status and said local record of connected status to said host computer;

d) receiving at said local extender a request from said host computer to clear said change in connection status information and having said local extender clear said local record of the change in connection status information;

e) receiving at said local extender a request from said host computer to clear enabled status information of said USB peripheral device and having said local extender clear its local record of enabled status information; and

f) receiving at said local extender a further request from said host computer for the status of said USB peripheral device and having said local extender provide said cleared local record of the change in connection status and said cleared local record of enabled status to said host computer.

20. A method as claimed in Claim 19 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

21. A method as claimed in Claim 16 for determining the network address of a USB function wherein said USB function may be a USB hub or a USB peripheral device, and wherein a plurality of said USB functions may be distributed around a data communications network, and wherein a USB address is allocated to each USB function by a host computer, which method comprises:

a) building a data record for each first USB function connected directly or indirectly to said network and identifying each record by a unique USB address assigned dynamically by said host computer;

b) recording within said data record the USB address of the upstream USB hub to which said first USB function is connected;

c) recording within said data record the port number of the upstream USB hub to which said first USB function is connected;

d) recording within said data record the USB address of each downstream USB function connected directly to said first USB function;

e) recording within said data record the port number of said first USB function to which each downstream USB function is connected; and

f) recording the network address assigned to said first USB function.

22. A method as claimed in Claim 16 for transmitting a USB command from a host computer, through a local extender, to a unique network address on a data communications network, which method comprises:

a) receiving at a local extender a USB command from a host computer;

b) extracting a first USB address from said USB command;

c) using said first USB address to access a first data record within a table of similar records;

d) determining whether said first data record contains a valid network address;

e) extracting from said first data record a second USB address identifying the upstream USB hub through which said first USB address may be accessed;

f) repeating steps (c) through (e) until a valid network address is found;

g) encapsulating said USB command in a network packet;

h) addressing said network packet to said valid network address; and

i) transmitting said addressed network packet to said data communications network.

23. A method as claimed in Claim 15 for conducting asynchronous data transactions, between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session, having said local extender forward said first request across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first request from said remote extender;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further request from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender generate a positive acknowledgement response to said USB peripheral device, and then having said remote extender forward said data transfer response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a data transfer response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded data transfer response from said remote extender and having said local extender store said forwarded data transfer response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded data transfer response, and then having said local extender forward said retrieved data transfer response to said host computer.

24. A method as claimed in Claim 23 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

25. A method as claimed in Claim 15 for conducting asynchronous data transactions between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a first notification from said host computer for the start of a split data transfer session, having said local extender forward said first notification across a network to said remote extender, and then having said local extender generate a negative acknowledgement response to said host computer;

b) receiving at a local extender a subsequent notification from said host computer for the start of a split data transfer session and having said local extender continue to generate negative acknowledgement responses to said host computer until said local extender receives a response to said forwarded first notification from said remote extender;

c) receiving at a remote extender said forwarded first notification for the start of a split data transfer session, having said remote extender convert said forwarded notification for the start of a split data transfer session into a classic-speed notification for data transfer, and then having said remote extender forward said classic-speed notification for data transfer to said USB peripheral device;

d) generating at a remote extender a positive acknowledgement response and forwarding said positive acknowledgement response across a network to said local extender;

e) receiving at a local extender said forwarded positive acknowledgement response and having said local extender store said forwarded positive acknowledgement response in local memory;

f) receiving at a local extender a further notification from said host computer for the start of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer;

g) receiving at a remote extender a positive acknowledgement response from said USB peripheral device and having said remote extender forward said positive acknowledgement response across a network to said local extender;

h) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a positive acknowledgement response, and then having said local extender generate a not-yet acknowledgement to said host computer;

i) receiving at a local extender said forwarded positive acknowledgement response from said remote extender and having said local extender store said forwarded positive acknowledgement response in local memory; and

j) receiving at a local extender a further request for completion of a split data transfer session, having said local extender retrieve from local memory said forwarded positive acknowledgement response, and then having said local extender forward said retrieved positive acknowledgement response to said host computer.

26. A method as claimed in Claim 25 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

27. A method as claimed in Claim 15 for conducting isochronous data transactions between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a device to host direction, through a remote extender and a local extender, which method comprises:

a) receiving at a local extender a first request from said host computer for the start of a split data transfer session and having said local extender forward said first request for the start of a split data transfer session across a network to said remote extender;

b) receiving at a local extender a first request for completion of a split data transfer session, having said local extender check local memory for the absence of a complete sequence of split data transfer responses, and then having said local extender generate a null data response to said host computer;

c) receiving at a remote extender said forwarded first request for the start of a split data transfer session, having said remote extender convert said forwarded request for the start of a split data transfer session into a classic-speed request for data transfer, and then having said remote extender forward said classic-speed request for data transfer to said USB peripheral device;

d) receiving at a remote extender a data transfer response from said USB peripheral device and having said remote extender convert said received data transfer response into a sequence of split data transfer responses, and then having said remote extender forward said sequence of split data transfer responses across a network to said local extender;

e) receiving at a local extender said forwarded sequence of split data transfer responses from said remote extender and having said local extender store said forwarded sequence of split data transfer responses in local memory;

f) receiving at a local extender a subsequent request from said host computer for the start of a split data transfer session and having said local extender forward said subsequent request across a network to said remote extender; and

g) receiving at a local extender a sequence of subsequent requests for completion of a split data transfer session, having said local extender check local memory for the presence of a complete sequence of split data transfer responses, and then having said local extender retrieve said sequence of split data responses from memory and forward said sequence of split data responses to said host computer.

28. A method as claimed in Claim 27 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

29. A method as claimed in Claim 15 for conducting isochronous data transactions between a host computer and a USB peripheral device, wherein said host computer operates at high-speed and said USB peripheral device operates at classic-speed (full-speed or low-speed), and wherein said data travels in a host to device direction, through a local extender and a remote extender, which method comprises:

a) receiving at a local extender a notification from said host computer for the start of a split data transfer session, having said local extender forward said notification for the start of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the start of a split data transfer session in local memory;

b) receiving at a local extender a first notification from said host computer for the continuation of a split data transfer session, having said local extender forward said first notification for the continuation of a split data transfer session across a network to said

remote extender, and then having said remote extender store said first notification for the continuation of a split data transfer session in local memory;

c) receiving at a local extender a further notification from said host computer for the continuation of a split data transfer session, having said local extender forward said further notification for the continuation of a split data transfer session across a network to said remote extender, and then having said remote extender store said further notification for the continuation of a split data transfer session in local memory;

d) receiving at a local extender a notification from said host computer for the completion of a split data transfer session, having said local extender forward said notification for the completion of a split data transfer session across a network to said remote extender, and then having said remote extender store said notification for the completion of a split data transfer session in local memory;

e) assembling at a remote extender said stored notification for the start of a split data transfer, said stored first notification for the continuation of a split data transfer, said stored further notification for the continuation of a split data transfer and said stored notification for the completion of a split data transfer session into a classic-speed notification of data transfer; and

f) having said remote extender forward said classic-speed notification of data transfer to said USB peripheral device.

30. A method as claimed in Claim 29 wherein said method operates over a data communications network in which the round-trip delay exceeds 1 microsecond.

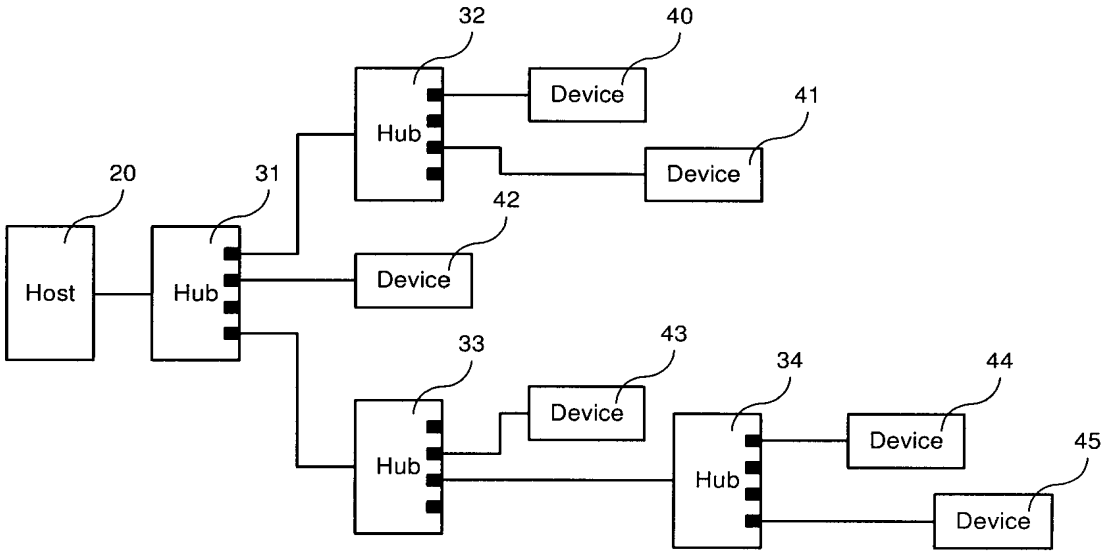


Figure 1 (Prior Art)

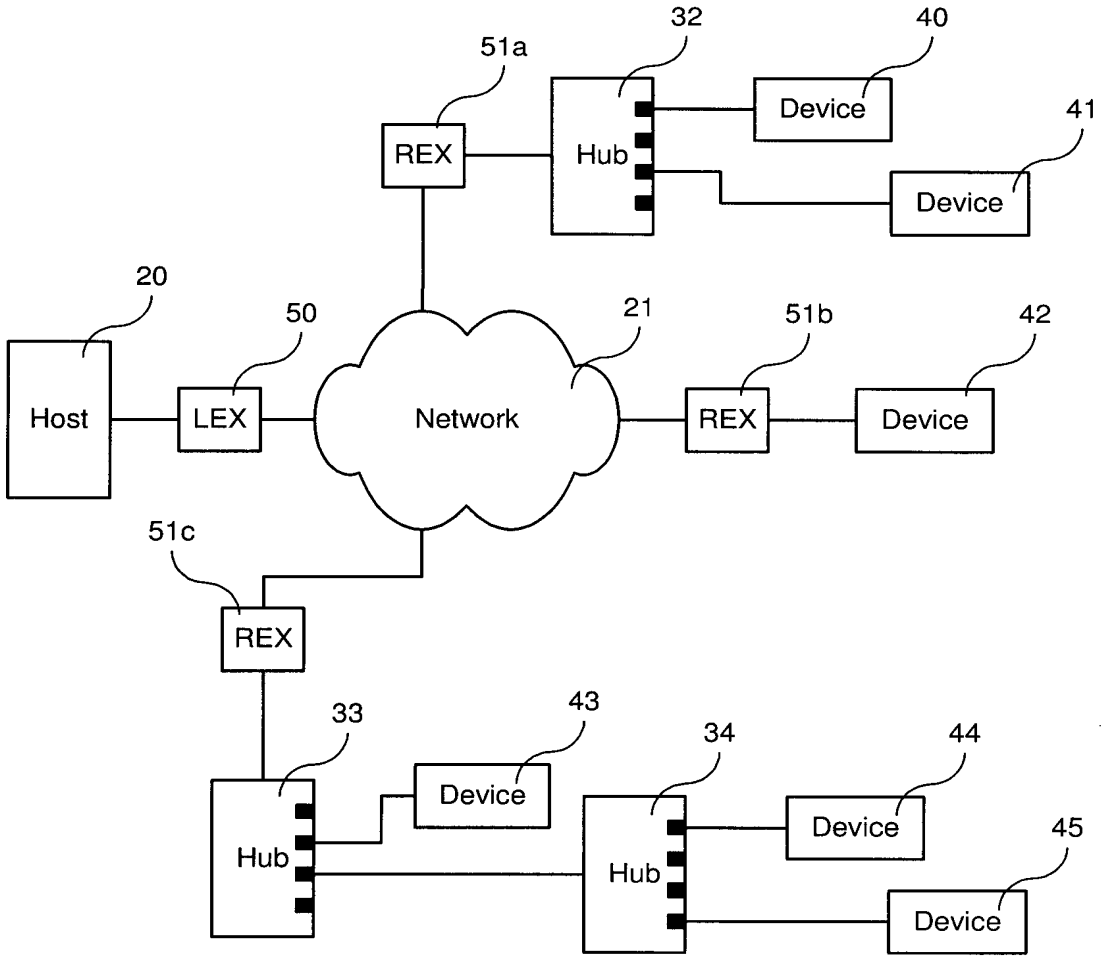

32
40
51a
Device
41
REX
Hub
Device
20
50
21
51b
42
Host
LEX
Network
REX
Device
51c
REX
33
43
34
44
Device
Hub
Device
Hub
45
Device

Figure 2

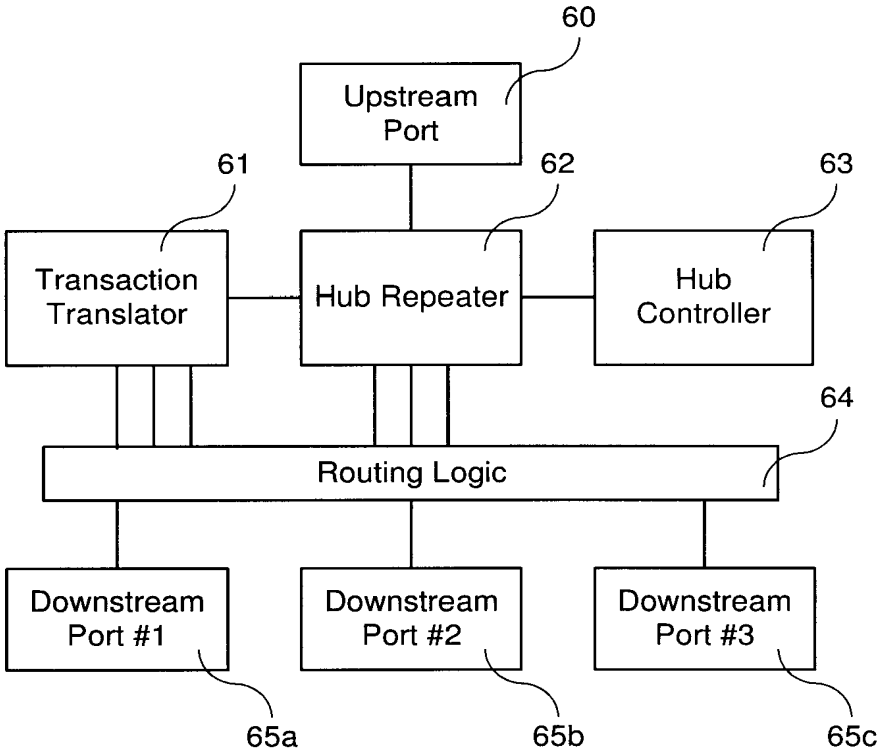


Figure 3 (Prior Art)

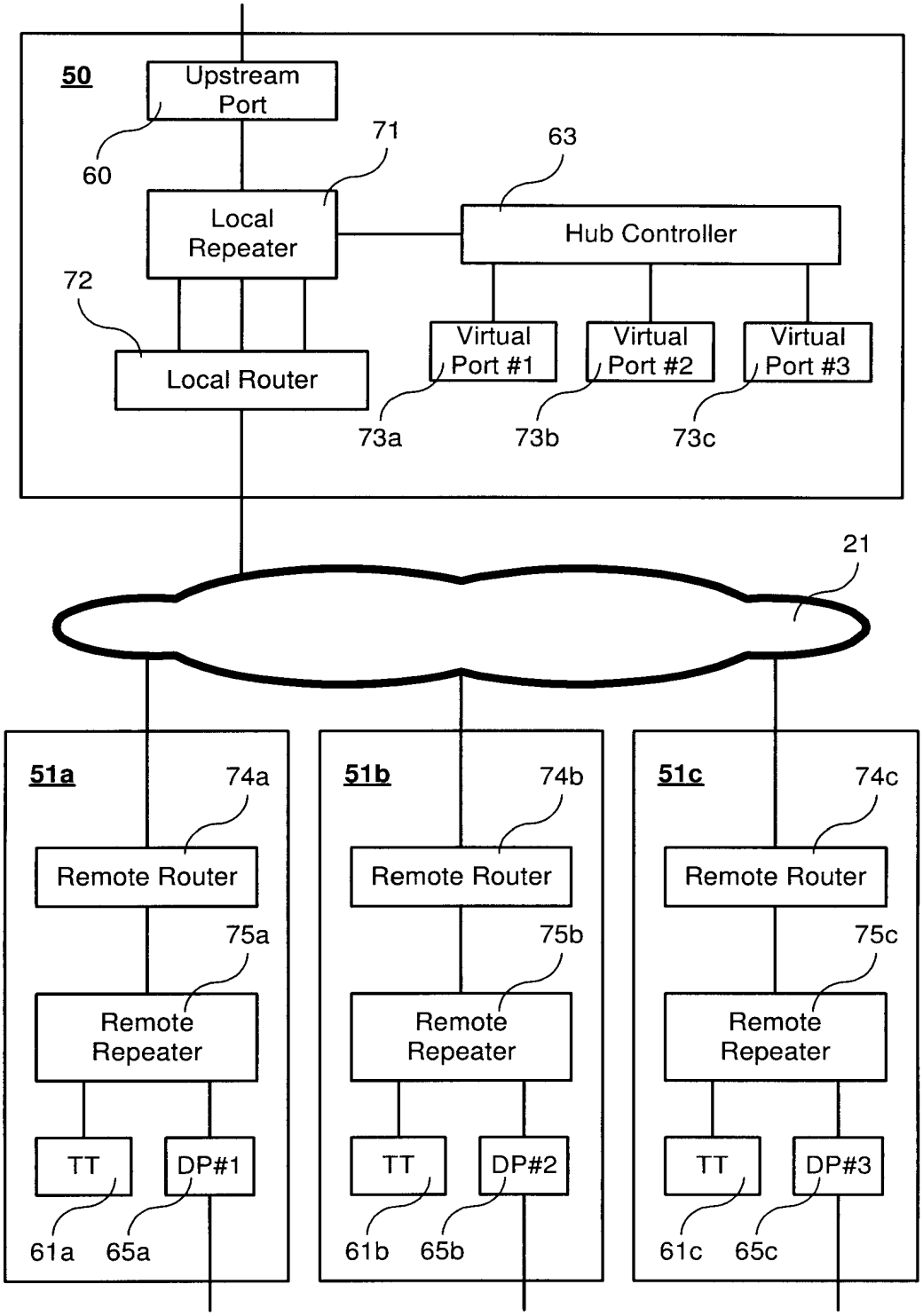

50
Upstream Port
60
71
63
Local Repeater
Hub Controller
72
Local Router
Virtual Port #1
Virtual Port #2
Virtual Port #3
73a
73b
73c
21
51a
74a
Remote Router
75a
Remote Repeater
TT
DP#1
61a
65a
51b
74b
Remote Router
75b
Remote Repeater
TT
DP#2
61b
65b
51c
74c
Remote Router
75c
Remote Repeater
TT
DP#3
61c
65c

Figure 4

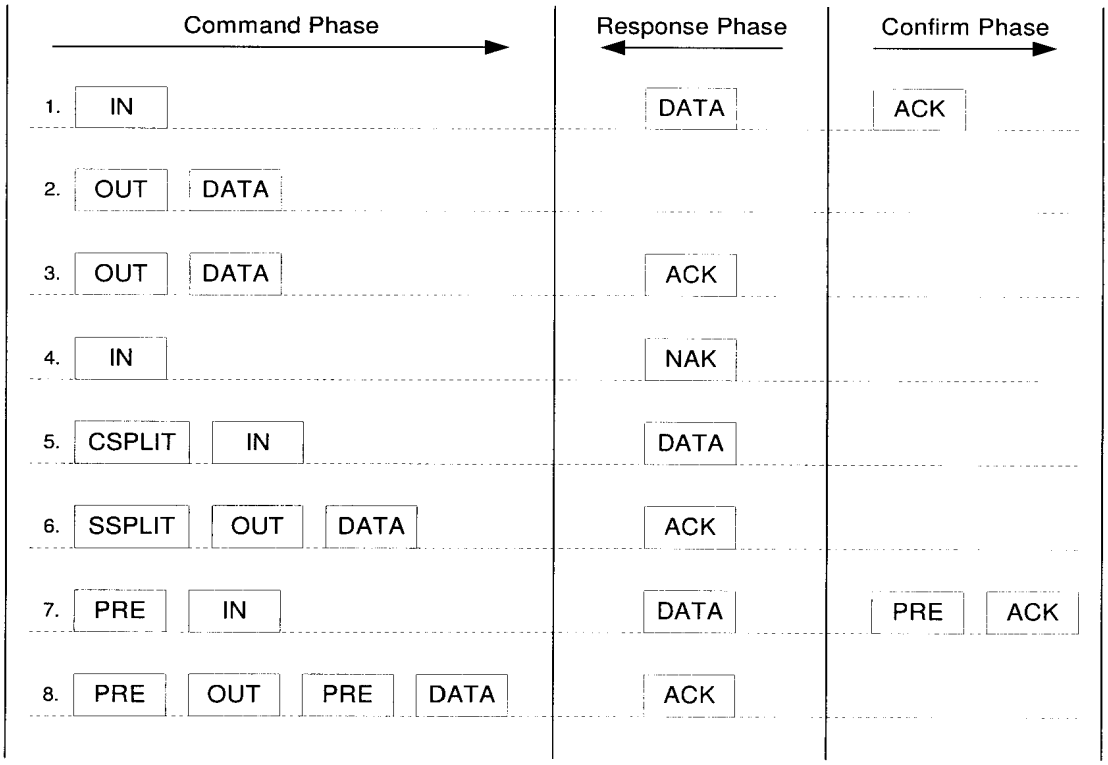


Figure 5 (Prior Art)

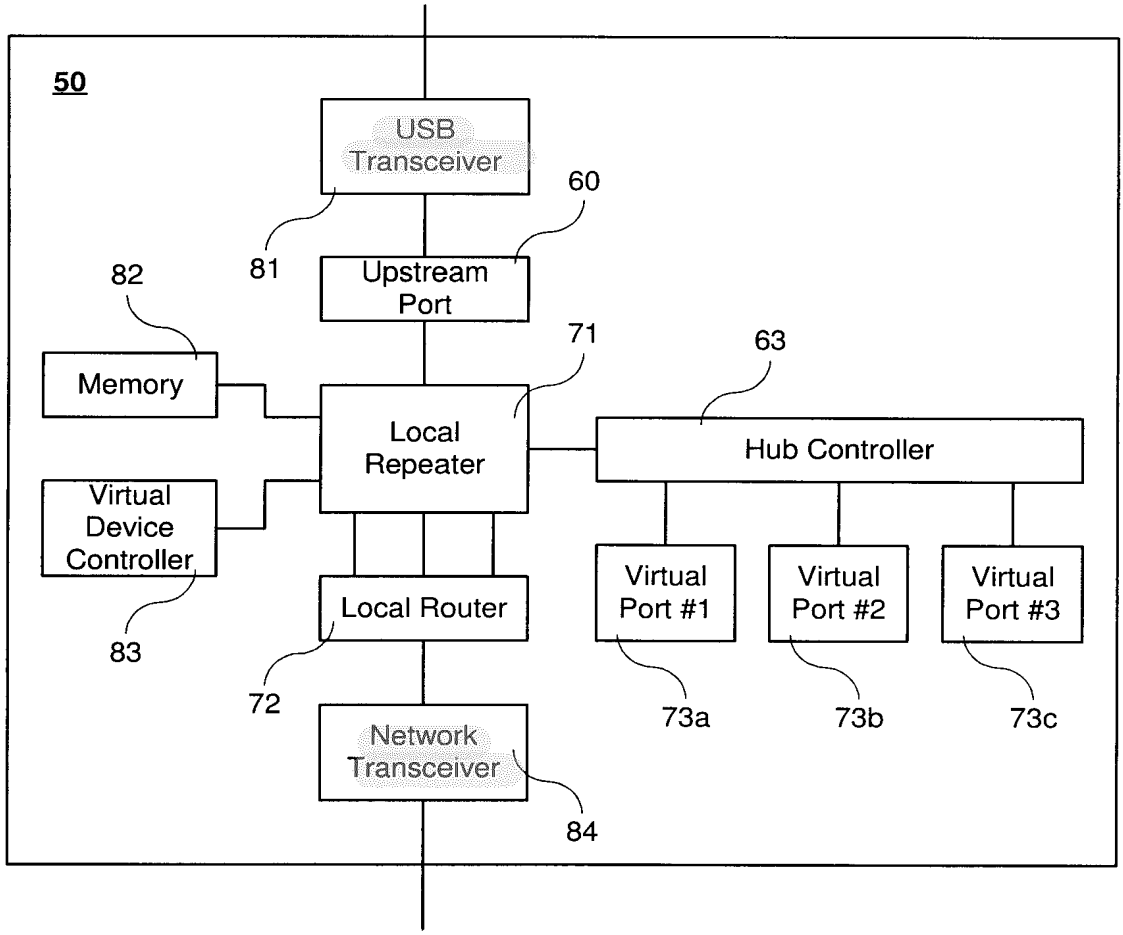

50
USB Transceiver
60
81
Upstream Port
82
71
63
Memory
Local Repeater
Hub Controller
Virtual Device Controller
Local Router
Virtual Port #1
Virtual Port #2
Virtual Port #3
83
72
73a
73b
73c
Network Transceiver
84

Figure 6

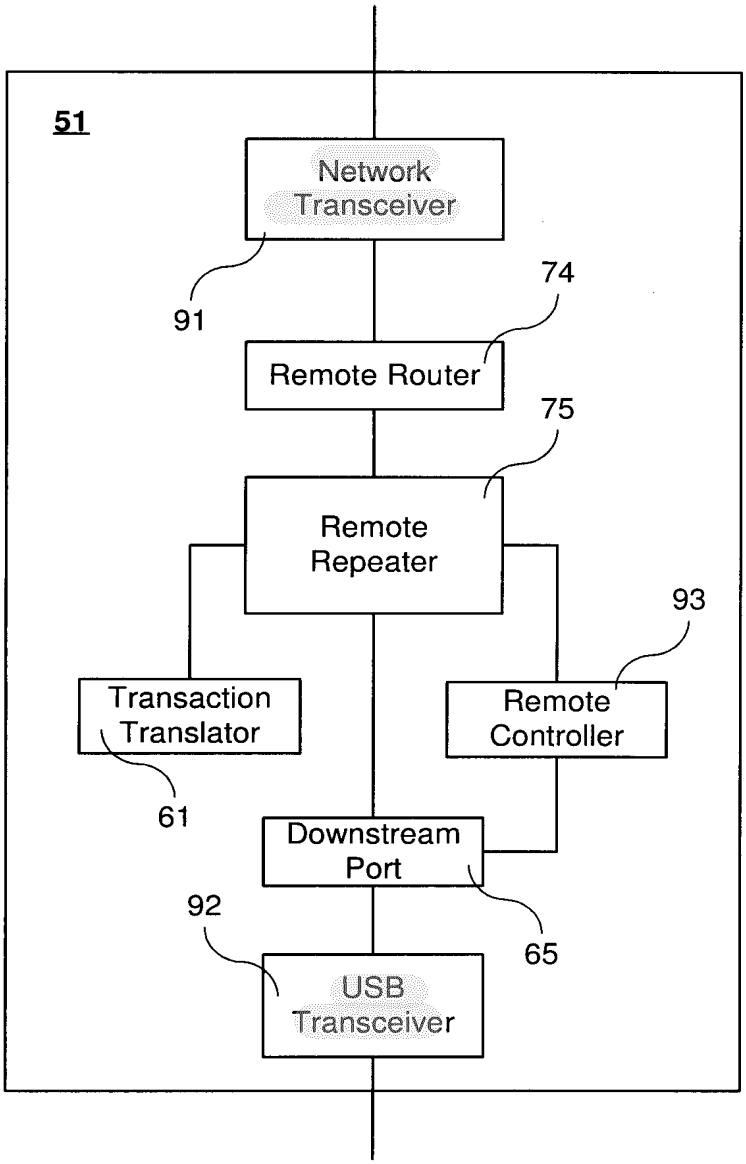

51
Network Transceiver
91
74
Remote Router
75
Remote Repeater
93
Transaction Translator
Remote Controller
61
Downstream Port
92
65
USB Transceiver

Figure 7

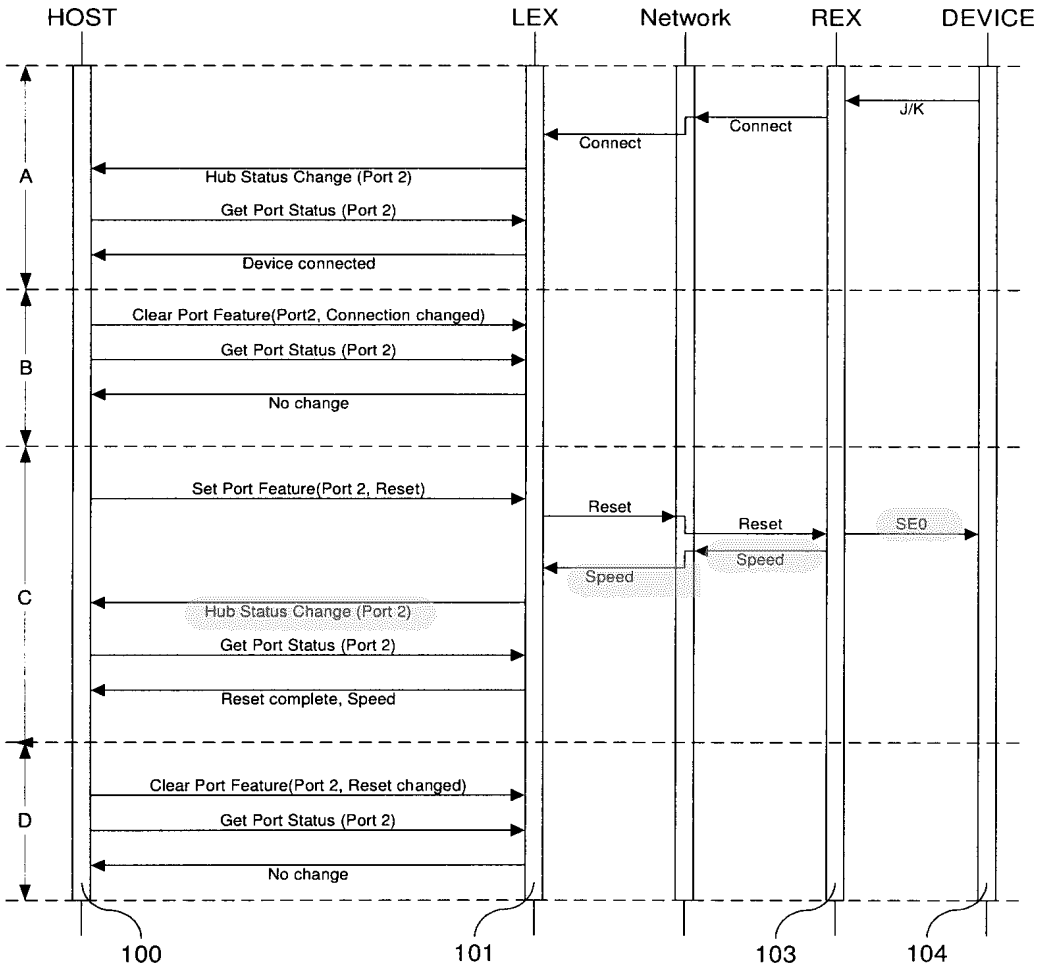

HOST
LEX
Network
REX
DEVICE
J/K
Connect
Connect
A
Hub Status Change (Port 2)
Get Port Status (Port 2)
Device connected
Clear Port Feature(Port2, Connection changed)
Get Port Status (Port 2)
B
No change
Set Port Feature(Port 2, Reset)
Reset
Reset
SE0
Speed
Speed
C
Hub Status Change (Port 2)
Get Port Status (Port 2)
Reset complete, Speed
Clear Port Feature(Port 2, Reset changed)
Get Port Status (Port 2)
D
No change
100
101
103
104

Figure 8

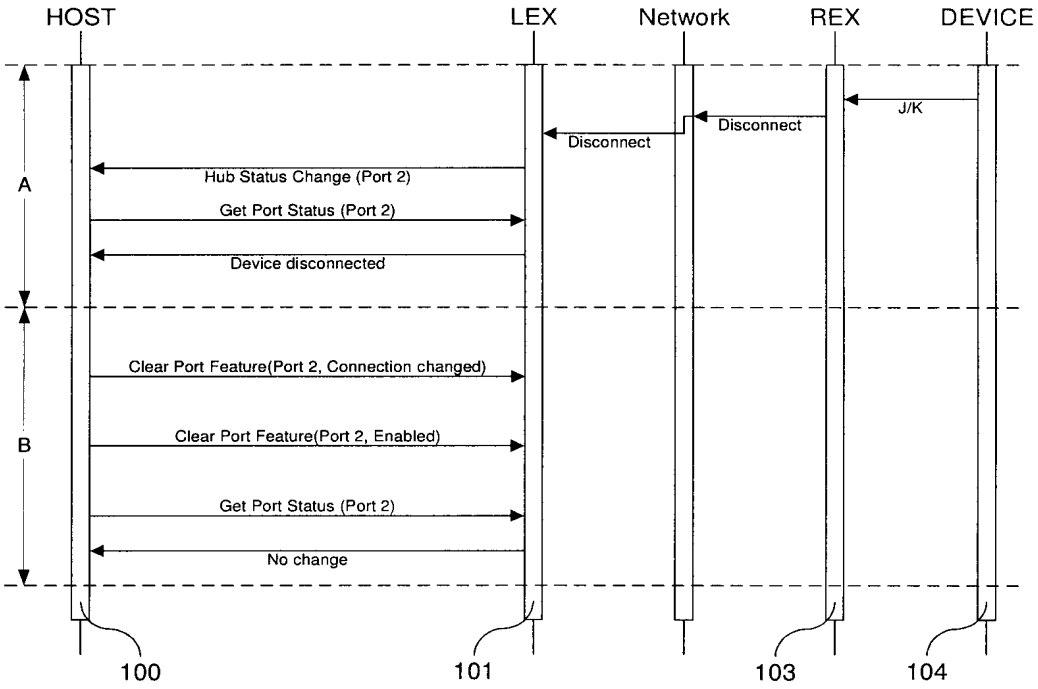

HOST
LEX
Network
REX
DEVICE
J/K
Disconnect
Disconnect
A
Hub Status Change (Port 2)
Get Port Status (Port 2)
Device disconnected
B
Clear Port Feature(Port 2, Connection changed)
Clear Port Feature(Port 2, Enabled)
Get Port Status (Port 2)
No change
100
101
103
104

Figure 9

Device	Parent		Child				Network
	Address	Port	Port #1	Port #2	Port #3	Port #4	
"							
"							
31	Null	Null	32	42	-	33	N0
32	31	1	40	-	41	-	N1
33	31	4	-	43	34	-	N3
34	33	3	44	-	-	45	
"							
"							
40	32	1					
41	32	3					
42	31	2					N2
43	33	2					
44	34	1					
45	34	4					

Figure 10

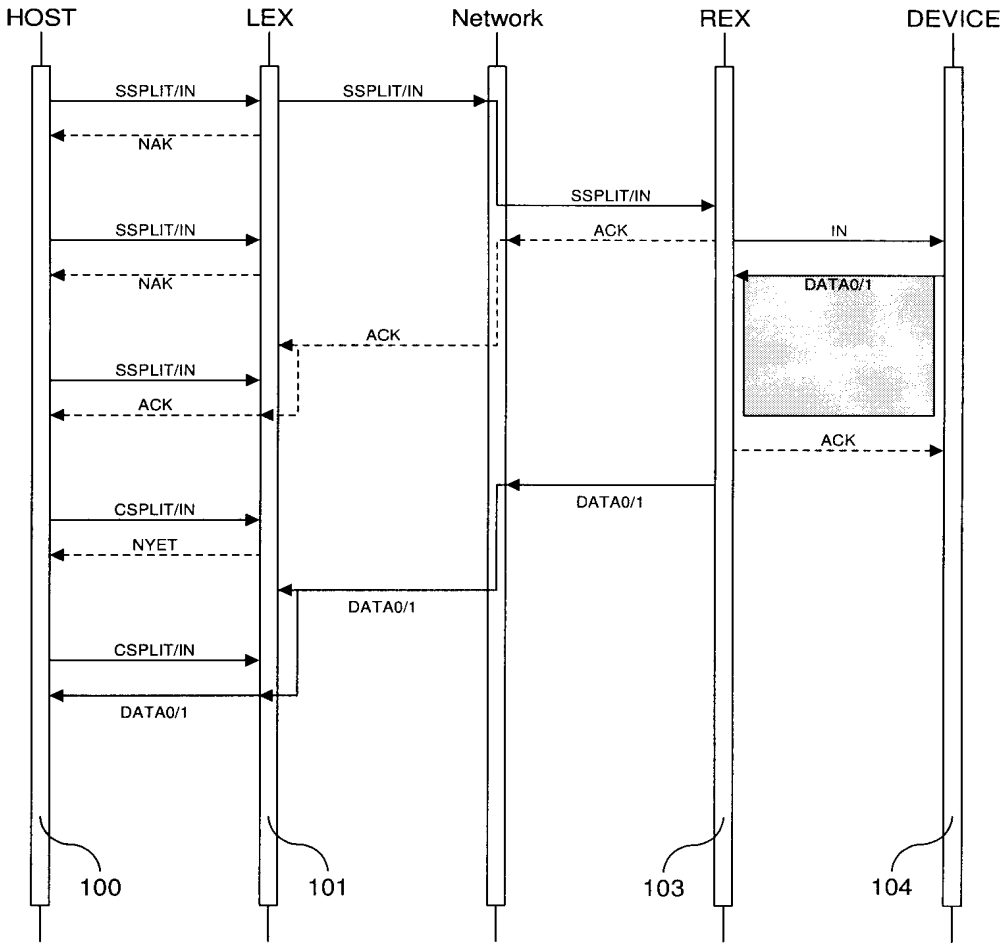

HOST
LEX
Network
REX
DEVICE
SSPLIT/IN
SSPLIT/IN
NAK
SSPLIT/IN
ACK
IN
SSPLIT/IN
NAK
DATA0/1
ACK
SSPLIT/IN
ACK
ACK
DATA0/1
CSPLIT/IN
NYET
DATA0/1
CSPLIT/IN
DATA0/1
100
101
103
104

Figure 11

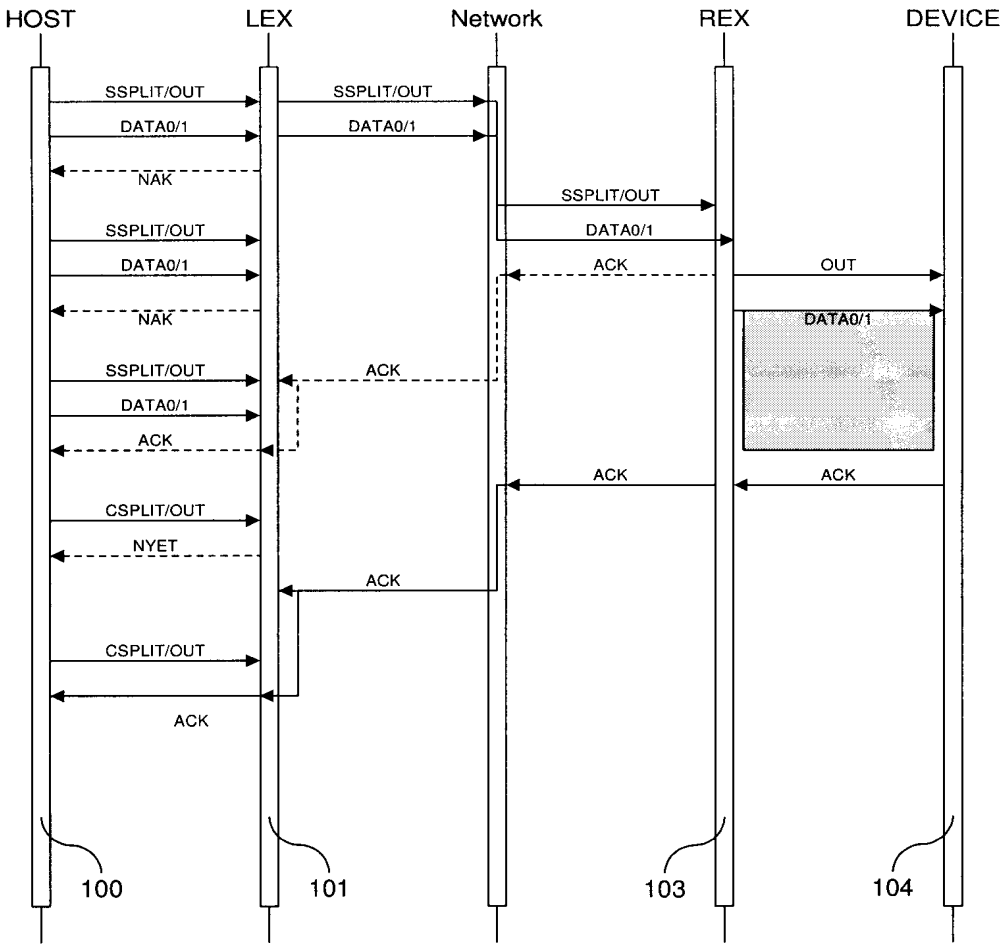

HOST
LEX
Network
REX
DEVICE
SSPLIT/OUT
SSPLIT/OUT
DATA0/1
DATA0/1
NAK
SSPLIT/OUT
DATA0/1
SSPLIT/OUT
DATA0/1
ACK
OUT
NAK
DATA0/1
SSPLIT/OUT
ACK
DATA0/1
ACK
ACK
ACK
CSPLIT/OUT
NYET
ACK
CSPLIT/OUT
ACK
100
101
103
104

Figure 12

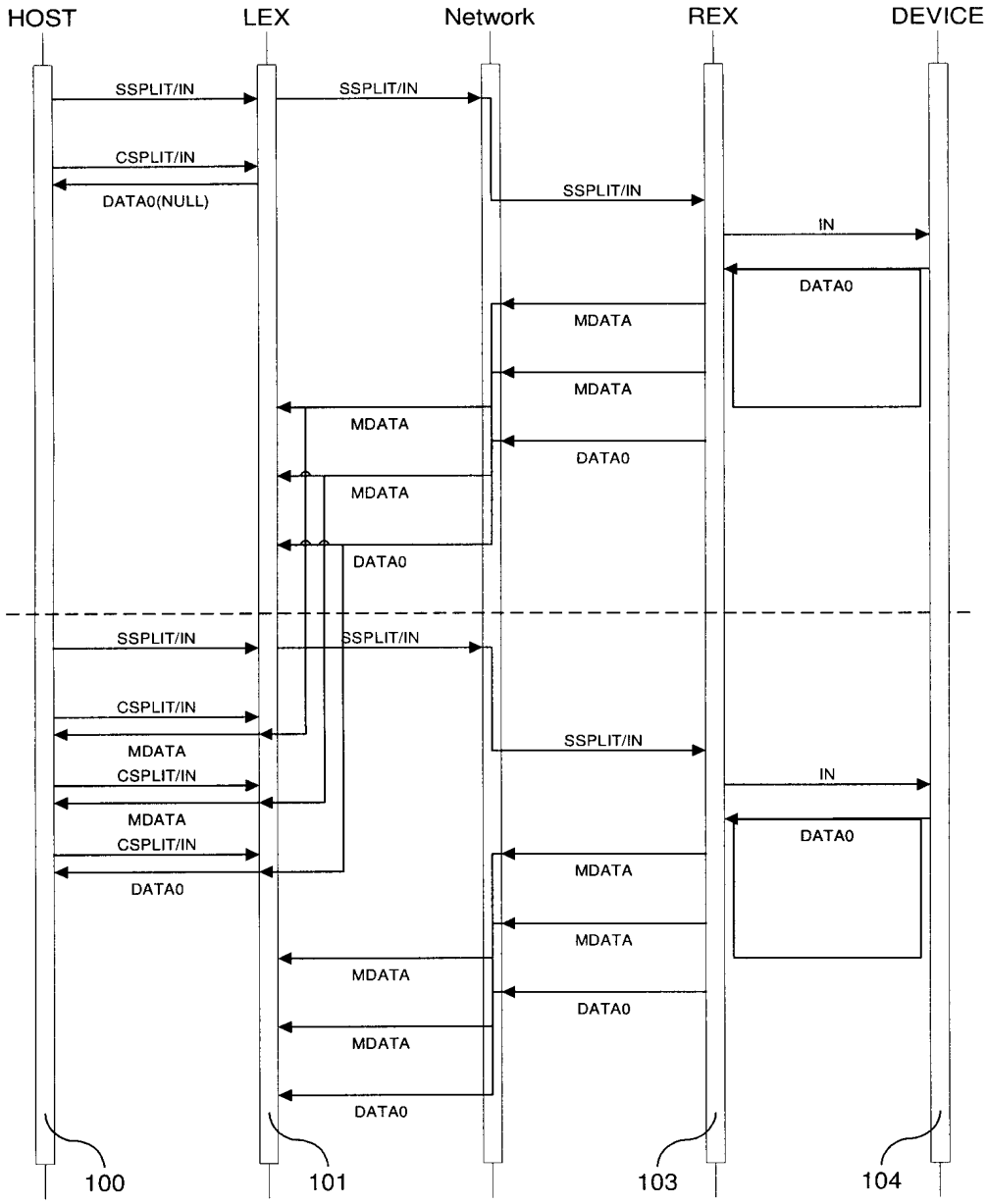

HOST
LEX
Network
REX
DEVICE
SSPLIT/IN
SSPLIT/IN
CSPLIT/IN
DATA0(NULL)
SSPLIT/IN
IN
DATA0
MDATA
MDATA
MDATA
DATA0
MDATA
DATA0
SSPLIT/IN
SSPLIT/IN
CSPLIT/IN
MDATA
SSPLIT/IN
CSPLIT/IN
IN
MDATA
DATA0
CSPLIT/IN
MDATA
DATA0
MDATA
MDATA
MDATA
DATA0
MDATA
DATA0
100
101
103
104

Figure 13

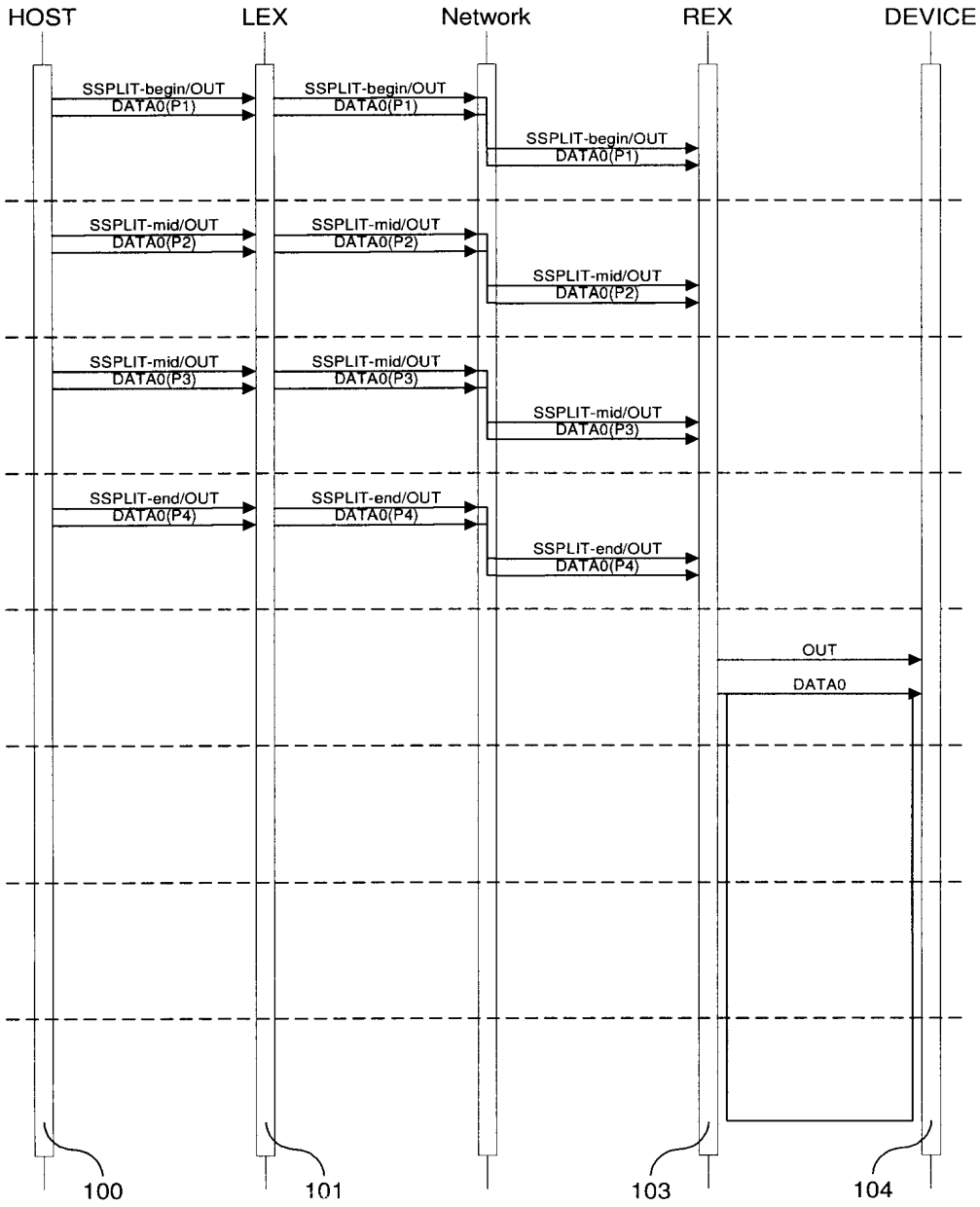

HOST
LEX
Network
REX
DEVICE
SSPLIT-begin/OUT
DATA0(P1)
SSPLIT-begin/OUT
DATA0(P1)
SSPLIT-begin/OUT
DATA0(P1)
SSPLIT-mid/OUT
DATA0(P2)
SSPLIT-mid/OUT
DATA0(P2)
SSPLIT-mid/OUT
DATA0(P2)
SSPLIT-mid/OUT
DATA0(P3)
SSPLIT-mid/OUT
DATA0(P3)
SSPLIT-mid/OUT
DATA0(P3)
SSPLIT-end/OUT
DATA0(P4)
SSPLIT-end/OUT
DATA0(P4)
SSPLIT-end/OUT
DATA0(P4)
OUT
DATA0
100
101
103
104

Figure 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2007/001341

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***G06F 13/00*** (2006.01) , ***G06F 13/38*** (2006.01) , ***H04L 12/40*** (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***G06F 13/00*** (2006.01) , ***G06F 13/38*** (2006.01) , ***H04L 12/40*** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Canadian Patents Database, IEEEXplore, West, QWEB Keywords: local extender, remote extender , delay, virtual, port, hub, USB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US20040205279 (Ohnishi) 14 October 2004 (14-10-2004) * paragraphs 0008, 0012, 0014, 0026, 0027, 0049, 0117 *	1-4, 7-20
Y	Figure 1	5
Y	US20060020736 (Jackson) 26 January 2006 (26-01-2006) * paragraphs 0629-0633 *	5
P, X	US20060206636 (McLeod) 14 September 2006 (14-09-2006) * paragraphs 0013, 0015, 0017-0032 *	1, 15
A	US6721332 (McAlear) 13 April 2004 (13-04-2004) * whole document *	1-30
A	US20020144042 (Garney) 03 October 2002 (03-10-2002) * whole document *	1-30

[ ] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 October 2007 (05-10-2007)	21 November 2007 (21-11-2007)

Name and mailing address of the ISA/CA	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Mark J. Stephens 819- 934-3472

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. [ ] Claim Nos. :
because they relate to subject matter not required to be searched by this Authority, namely :

2. [ ] Claim Nos. :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :

3. [ ] Claim Nos. :
because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

1-6, 15-30 a local extender device which accommodates delays associated which a USB device is not normally capable of handling

7-14 determination of status of a remote USB device

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [X] As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2004205279	14-10-2004	JP2004295333 A	21-10-2004
		US7111106 B2	19-09-2006
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		US6886062 B2	26-04-2005
		WO02080008 A1	10-10-2002

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 04/12/2023

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Suite 2700
Minneapolis, MN 55402-1683

EXAMINER
MISIURA, BRIAN THOMAS

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
04/12/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Office Action Summary	Application No. 16/771,068	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 1/27/2023.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 58-66,68-79 and 81 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 58-66,68-79 and 81 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 6/9/2022 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 3/8/2023, 1/25/2023, 11/1/2022, 8/10/2022.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Arguments

Applicant's arguments with respect to claims 58 and 69 have been considered but are moot in view of the new ground(s) of rejection.

Claim Interpretation

The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term “means” or “step” or a term used as a substitute for “means” that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application (**Claim 65**) that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of

rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 58-66, 68-79, and 81 are rejected under 35 U.S.C. 103 as being unpatentable over **Brands** et al. U.S. PGPUB No. 2015/0121466 in view of **Christison** et al. U.S. Patent No. 7,761,627 (both previously cited).

Per Claim 58, Brands discloses:

- a system for connecting a processing device (**Paragraph 118, Processing device 31 such as a laptop computer.**) to a functional device (**Paragraphs 120-121; display 44, whiteboard 45, camera 35, microphones 38**) connected to or in a base unit (**Paragraphs 119-122; base node 36**) of a wireless network (**Paragraphs 88, 118, and 119; wireless network 50**),
- the system comprising: the base unit having a transmitter (**Paragraph 130; Base node 36 comprises a wireless transmitter/receiver.**),
- a first display device connected to or in the base unit (**Paragraphs 120 and 124, Figures 1a and 1b; "base node 36 being coupled to a central display 44"**),

- at least one functional device connected to or in the base unit (**Paragraphs 120-121; Any of the whiteboard 45, display 44, cameras 39-41, or microphones 38 can be considered a "functional device".**),
- the processing device having a memory, a second display device, and an operating system (**Paragraph 118; Devices such as laptop computers and tablet computing devices each comprise memory, displays, and OS's.**),
- a third party software for a Unified Communication call (**Paragraph 152, "multiple participants…engage in a media conference"; Paragraph 153, "a dedicated software client"**), a driver and a client software, when executed on the processing device, is configured to have the processing device interact directly with the base unit over a wireless connection (**Paragraph 128, "portable application 60"; Paragraph 138, "portable application" and "pre-installed generic drivers", See embodiment of Fig. 11**),
- wherein the base unit, via the transmitter, is configured to transmit data over the wireless connection to the processing device (**Paragraphs 128-130**),
- wherein the client software (**portable application 60**), when executed by a processor of the processing device, is configured to provide any simulations or translations, as required to allow interaction between the first display device and the processing device (**Paragraphs 128, 138-140; Paragraphs 194-196 and Figure 11 discuss a tablet connection to a base station and further discuss how a data exchange between two computing devices can be done independently of the internet (e.g. direct wireless connection between the two devices). Paragraphs 203-209 and 233, Figure 12, discuss an embodiment where a smartphone P31 can be communicably connected to and view the contents of a display D1. Smartphone P31 can perform a "transform function" to transform display data received by the smartphone from other connected display devices to match an appropriate screen dimension and resolution. The smartphone further allows customization of the display. (Note: "simulations or translations" represents an alternative limitation scenario requiring only one of the instances listed be taught by the prior art to deem it unpatentable. In this instance, Brands is**

considered to teach at least "translations" as it is broadly presented in the claim.)),

- and the third party software for the unified communication call is presented with the virtual functional device for the unified communication call (**Paragraphs 123, 127, and 152 disclose that a media conference is conducted using the invention presented in the disclosure. Paragraph 153 discloses a "dedicated software client". The peripheral devices present within meeting room 30 will be available to participants 37 of processing devices 31 to utilize during the media conference.**),
- the processing device being configured to host the unified communication between two or more other processing devices (**Paragraphs 148-242 provide an in-depth configuration of a media conference between "multiple participants".**).

Brands discloses that base node 36 interconnects processing devices 31 with display 44, whiteboard 45, and/or other peripheral devices such as cameras, loudspeakers, and microphones. The interconnected processing and peripheral devices allow for an electronic meeting to take place by way of sharing media content from the plurality of different devices using the display(s) in a meeting room 30 **(Paragraphs 119-124 and 127)**. Brands further teaches the portable application's role in coordinating the interactions between the processing devices 31 and the peripheral devices present within meeting room 30 (**Paragraphs 128 and 138-140**). Brands does not specifically disclose presenting a functional device as a virtual functional device to the processing device.

However, Christison similarly discloses connecting a host computing device via an integrated wireless transmitter (**Col. 3 lines 34-47, Figure 2**) directly to a wireless hub device (**1000**) which is directly connected to a plurality of peripheral devices (**Fig. 10**). Christison further discloses exposing endpoints to a host device so that they appear as though they are native USB devices (**Col. 6 line 13 – Col. 7 line 35; Wired devices appear to the host as if they are native WUSB devices. Since these devices are**

not directly attached to the host computing device, they are "virtual" function devices available for the host to use.).

- It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to implement the endpoint representation of USB devices as taught by Christison within the collaborative meeting system of Brands in order to provide a seamless integration for a meeting participant to access all of the functional devices present within the disclosure of Brands, such as various USB devices like a camera, microphone, and/or speaker.

Per Claim 59, Brands discloses the system of claim 58, wherein the client software and the driver are configured to present a simulated speakerphone to the operating system to create a virtual microphone and a virtual speakerphone (**Paragraph 121; A microphone 38 and loud speaker is provided for use by the processing devices 31.**). Similar to Claim 58, Brands does not specifically teach the virtualized devices. However, please refer to the above rejection of Claim 58 with respect to Christison teaching the virtualized presentation of the peripheral devices to the client processing system. It further would have been obvious to one having ordinary skill in the art to include the microphone and loud speakers of Brands as the virtualized devices as taught by Christison.

Per Claim 60, Brands discloses the system of claim 58, wherein the client software and the driver are configured to present a simulated videocam to the operating system to create a virtual videocam device (**Paragraph 120; camera 35**). Similar to Claim 58, Brands does not specifically teach the virtualized devices. However, please refer to the above rejection of Claim 58 with respect to Christison teaching the virtualized presentation of the peripheral devices to the client processing system. It further would have been obvious to one having ordinary skill in the art to include the video camera of Brands as the virtualized devices as taught by Christison.

Per Claim 61, Brands discloses the system of claim 58, wherein the client software is configured to provide video data, optionally obtained by screen scraping, directly to the base unit, wherein the base unit processes the video data (**Paragraph 140; Base unit 36 receives screen scraped video data and auto composes it for the central display.**).

Per Claim 62, Brands discloses the system of claim 58, wherein the processing device processes video data received from the base unit via the transmitter over the wireless connection (**Paragraphs 64 and 65; "The executable software code can comprise eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content." The executable software code is stored for execution on the processing device.**).

Per Claim 63, Brands discloses the system of claim 62, wherein the processing of the video data comprises decoding and compositing or decrypting the video data (**Paragraphs 64 and 65; "The executable software code can comprise eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content."**)

Per Claim 64, Brands discloses the system of claim 58, wherein the at least one functional device which is presented to the operating system as a virtual functional device, is one or more of a data capturing device, a microphone, a speakerphone, a speaker, another display, a touchscreen, a projector, a camera, a video camera, and a webcamera (**Paragraphs 120-122**). Please see the above rejection of Clam 58 for explanation of how Christison teaches the "virtual functional device" limitation.

Per Claim 65, Brands discloses the system according to claim 58, further comprising means for encoding, optionally encrypting the data (**Paragraphs 60, 63, and 256-259**).

Per Claim 66, Brands discloses the system according to claim 58, wherein the processing device is adapted to host a unified communication between two or more

further processing devices (**Paragraph 152; Media conference featuring multiple participants**).

Per Claim 68, Brands discloses data source/sink endpoints configured to store or emit data (**Paragraphs 120-122**). Additionally, Christison discloses that their endpoints correspond to any USB peripheral devices, **Col. 1 lines 44-47**).

Per Claims 69-74 and 76-78, please refer to the above rejections of Claims 58-61, 63, 64, 66, and 68, respectively, as the limitations are substantially similar and the mapping of the references is equally applicable.

Per Claim 75, Brands discloses the method of claim 69, further comprising encoding, optionally encrypting the data (**Paragraphs 60, 63, and 256-259**).

Per Claim 79, Brands teaches the method of claim 70, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device (**Paragraph 196, Data exchange can be performed independently of the internet (e.g. direct wireless communication between both computing devices).**).

Per Claim 81, Brands teaches the system of claim 58, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device (**Paragraphs 194-196 and Figure 11 discuss a tablet connection to a base station and further discuss how a data exchange between two computing devices can be done independently of the internet (e.g. direct wireless connection between the two devices). Paragraphs 203-209 and 233, Figure 12, discuss an embodiment where a smartphone P31 can be communicably connected to and view the contents of a display D1.**).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889. The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached at (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/
Primary Examiner, Art Unit 2186

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	10/06/2021	BTM
H04L12/12, 0428, 1813	10/06/2021	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, CPC, Inventor, and EAST prior art search	10/06/2021	BTM
Review prosecution/search history of parent application no. 15/858,668	10/06/2021	BTM
IDS Consideration, Update prior art search	03/15/2022	BTM
IDS Consideration	07/25/2022	BTM
IDS Consideration and update previous search	04/07/2023	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L170	1	"20220173981"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 04:22 PM
L171	1	"20040010464"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/06 04:26 PM
L182	76	(wireless OR wifi OR wi-fi) (USB OR universal serial bus) (hub OR device hub OR peripheral device)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/04/07 09:59 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Office Action issued in Indian Application No. 202017017906, dated July 4, 2022, with English translation	X

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	04/06/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-08-10
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

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	1	Notice of Grounds of Rejection issued in corresponding Japanese Application No. 2020-536065, dated August 16, 2022, with English machine translation	☒
	2	"Skype for Business" Skype for Business product brochure, Microsoft Japan, October 29, 2015, with partial translation	☒

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	04/06/2023

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-11-01
Name/Print	Thomas Lee	Registration Number	66,396

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Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	
Examiner Name	
Attorney Docket Number	21063.0018USWO

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	1	20040010464	A1	2004-01-15	John Boaz	cited in Office Action issued in US 17/675641

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	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	
	Examiner Name	
	Attorney Docket Number	21063.0018USWO

	1	Office Action issued in US patent application 17/675,641, dated October 27, 2022	

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	04/06/2023

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Name/Print	Thomas Lee	Registration Number	66,396

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	1	2008011727	WO	A1	2008-01-31			

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	1	ICRON WiRanger Cable USB 2.0 Hub User Guide, by Icron Technologies Corporation, www.icron.com	
	2	Observations by a third party in European Application No. 18833045.0, dated February 17, 2023	
	3	Office Action issued in European Application No. 18833045.0, dated February 1, 2023	
	4	Office Action in Chinese Application No. 201880084464.1, dated January 19, 2023, with machine translation	X

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

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HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Courtesy Reminder for
Application Serial No: 16/771,068

Attorney Docket No: 21063.0018USWO
Customer Number: 52835
Date of Electronic Notification: 04/12/2023

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
PTOMail@hsml.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://ppair-my.uspto.gov/pair/PrivatePair.**
If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Written Opinion issued in parallel Singapore patent application No. 11202005201Y, dated 10 May 2023, 8 pages provided
	2	Office Action issued in U.S. Application No. 17/742166, mailed 9 May 2023

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-06-02
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	06/02/2023 04:25:24 PM ET	21063.0018USWO

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	62202019	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	06/09/2020
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	E202362G26448184	Yanling Cottle

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	$260.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement

Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PTA.IDS
Document Description: Patent Term Adjustment Stmt Under 37 CFR 1.704(d)

PTO/SB/133 (10-21)

PATENT TERM ADJUSTMENT STATEMENT UNDER 37 CFR 1.704(d)		
	Application Number	16/771068
	Filing Date	2020-06-09
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Practitioner Docket No.	21063.0018USWO

APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):

☐ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

AND/OR

☑ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

INSTRUCTIONS:

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	June 2, 2023
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66,396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**06/02/2023 04:25:24 PM ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

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PATENT CENTER #	62202019	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SB133_0018USWO.pdf	2	Patent Term Adjustment Statement under 37 CFR 1.704(d) filed with an IDS	255 KB
OA_SG.pdf	8	Other reference-Patent/Application/Search Documents	172 KB
Warning: The attached file contains comments or annotations. Comments are not recommended and may cause processing problems with the document.			
SB08_0018USWO.pdf	4	Information Disclosure	1234 KB

		Statement (IDS) Form (SB08)	
OA_US.pdf	35	Other reference-Patent/Application/Search Documents	3712 KB

Warning: The attached file contains comments or annotations. Comments are not recommended and may cause processing problems with the document.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
SB133_0018USWO.pdf	90470D9F931FC207BB8D2FB6A99991F71FB8FBD7B099B16BF A9A8DB2CF05520AB93F7B5BAF3DF46102E3544F85626844E2 AF85383EE3D27A2F7EA1EC86A36657
OA_SG.pdf	7376DAF476A115079253F4D9489CF4594F04483ED551FE7A39 4FA69133A341C8A2C1DFEE1A4B5B5EE6676F7CF9F886F073C CA1186415A3C8DE8F3227324901FE
SB08_0018USWO.pdf	51AF6477FAF503A5F4E9A5B6AD08E425832A79E2F86CE8AAD 221699992FB0167CA94C3139CBA766E7F6CB6631CF4B579602 5E74690956A232DD585B9A6B981DB
OA_US.pdf	82ABCE8843A39F79202224B03B1AFD96E681AC223F17A9678 DEC65F0723E06EA891C7FA564FDFF22F10C8FB309F9B70474 6EAC276844255DB327D550378C4E7D

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New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage

submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 06/30/2022

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
06/30/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Advisory Action Before the Filing of an Appeal Brief	Application No. 16/771,068	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 13 June 2022 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.
   b) ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection.The current period for reply expires ____ months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: See details below (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☑ For purposes of appeal, the proposed amendment(s):(a) ☑ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☑ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed:_____.
    Claim(s) objected to:_____.
    Claim(s) rejected:58-78.
    Claim(s) withdrawn from consideration:_____.

/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	

Continuation of REQUEST FOR RECONSIDERATION/OTHER 12.

The request for reconsideration has been considered but does NOT place the application in condition for allowance because: The amendments would require further search and or consideration of the prior art. Additionally, in a phone correspondence with the Applicant on 6/21/22, they indicated that an RCE was being filed.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 06/30/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER
MISIURA, BRIAN THOMAS

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
06/30/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Applicant-Initiated Interview Summary	**Application No.** 16/771,068	**Applicant(s)** RENARD et al.		
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
BRIAN T MISIURA	Primary Examiner	Video Conference
Thomas Lee (Reg. No. 66,396)	Attorney	
Mr. Donny Tytgat	Applicant Representative	

Date of Interview: 26 June 2023

Issues Discussed:

Proposed Amendment(s)

Applicant requested an interview to provide an overview of their invention, discuss the applied prior art, and explain how their proposed amendment (attached herewith) distinguishes over the prior art.

Specifically, the Applicant believes the proposed amendments, "wherein the client software is further configured to provide the simulations or translations based on a type of data from the at least one functional device to the processing device", distinguish over the prior art reference Christison.

The Examiner agrees that Christison does not specifically teach the proposed claim amendment. However, the Examiner notes that the primary reference Brands was cited as teaching the initial " simulations or translations" limitation. Therefore, sufficient arguments would need to be presented within the official response to show how the proposed amendments are not taught by the Brands reference or the combination of Brands and Christison.

The Examiner recommended filing an amendment within the AFCP program.

☑ Attachment

/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Applicant-Initiated Interview Summary	**Application No.** 16/771,068	**Applicant(s)** RENARD et al.		
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (First Inventor to File) Status** Yes	**Page** **2 of 2**

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventorship:	RENARD	Examiner:	MISIURA, BRIAN THOMAS
Serial No.:	16/771068	Group Art Unit:	2186
Filed:	June 9, 2020	Docket No.:	21063.0018USWO
Title:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		

INTERVIEW AGENDA – FOR DISCUSSION PURPOSES ONLY

Examiner Misiura,

Thank you for scheduling the interview and the web access link. A representative of the Applicant, Mr. Donny Tytgat will be joining the call. We provide the following comments to assist your preparation for the telephone interview scheduled on June 26, 2023 at 10 AM (EST).

PROPOSED CLAIM AMENDMENT

58. (Currently Amended) A system for connecting a processing device to a functional device connected to or in a base unit of a wireless connection, the system comprising:

the base unit having a transmitter,

a first display device connected to or in the base unit,

at least one functional device connected to or in the base unit, and

the processing device having a memory, a second display device, an operating system, a third party software for a Unified Communication call, a driver and a client software, when executed on the processing device, is configured to have the processing device interact directly with the base unit over a wireless connection,

wherein the base unit, via the transmitter, is configured to transmit data over the wireless connection to the processing device,

wherein the client software, when executed by a processor of the processing device, is configured to provide any simulations or translations, as required, to allow interaction between the first display device and the processing device, and wherein the client software and the driver, when executed on the processing device, are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, and the

third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call, the processing device being configured to host the Unified Communication between two or more other processing devices, and

wherein the client software is further configured to provide the simulations or translations based on a type of data from the at least one functional device to the processing device.

REMARKS

Rejection of claims 58-66, 68-79, and 81 over Brands (US20150121466) in view of Christison (US7761627)

Neither Brands nor Christison, taken alone or in combination, discloses or suggests the same combination of features as recited in Proposed Claim 58.

As admitted on page 6 of the Final Office Action, "Brands does not specifically disclose presenting a functional device as a virtual functional device to the processing device."

While Christison is relied on in the Office Action as disclosing such features, Applicant respectfully disagrees and further submits that Christison fails to disclose or suggest the features recited in Proposed Claim 58.

Rather, Christison teaches performing operations on the protocol layer above that is agnostic of the actual data flows. That is, Christison does not look at the type of data being transferred.

On the other hand, the features recited in Proposed Claim 58 are at least directed to creating different flows / behaviors dependent on the actual data modalities and interprets/processes the data accordingly. For example, as seen in Figs. 15 and 16, for example, in Fig. 15 (middle of page) shows that there are different data flows being done between the 'driver installed on PC', 'base unit' and 'peripheral'. That is, at the base unit, there is the 'data decode / processing / encryption' part that shows that the data isn't simply rearranged as in Christison, but that the functional data (e.g. audio stream, video stream) it is actually interpreted and transformed.

Therefore, since neither Brands nor Christison, taken alone or in combination, discloses or suggests the same combination of features as recited in Proposed Claim 58, Proposed Claim 58 is patentable over Brands and Christison.

I hope these comments are helpful. Please contact me if there was any problem in the transmission of this paper.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 S. 7th St., Suite 2700
Minneapolis, MN 55402
(612) 455-3800

Dated: June 23, 2023

By: _____/Thomas Lee/_____
Thomas Lee
Reg. No.: 66,396
TL/ajs

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/771,068	Filing Date 06/09/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/12/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 22	Minus	** 20	= 2		x $100 =	200
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	200

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/TAWANA E CAMPBELL/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
21063.0018USWO	16/771068	June 9, 2020
First Named Inventor:	**Title:**	
RENARD	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:
    - Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
    - The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
        - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
        - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
            - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
            - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Thomas Lee/	July 12, 2023
Name (Print/Typed) THOMAS LEE	**Practitioner Registration No.** 66396

***Note**: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

☐ * Total of _____ forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventorship:	RENARD	Examiner:	MISIURA, BRIAN THOMAS
Serial No.:	16/771068	Group Art Unit:	2186
Filed:	June 9, 2020	Docket No.:	21063.0018USWO
Title:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		

CERTIFICATE OF TRANSMISSION.
I hereby certify that this paper is being transmitted by EFS Web to the United States Patent & Trademark Office on July 12, 2023.

By: ____/Thomas Lee/_____
Name: Thomas Lee

AMENDMENT AND RESPONSE AFTER FINAL

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Commissioner:

In response to the Final Office Action issued April 12, 2023, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-57. (Cancelled)

58. (Currently Amended) A system for connecting a processing device to a functional device connected to or in a base unit of a wireless connection, the system comprising:

the base unit having a transmitter,

a first display device connected to or in the base unit,

at least one functional device connected to or in the base unit, and

the processing device having a memory, a second display device, an operating system, a third party software for a Unified Communication call, a driver and a client software, when executed on the processing device, is configured to have the processing device interact directly with the base unit over a wireless connection,

wherein the base unit, via the transmitter, is configured to transmit data over the wireless connection to the processing device,

wherein the client software, when executed by a processor of the processing device, is configured to provide any simulations or translations, as required, to allow interaction between the first display device and the processing device, and wherein the client software and the driver, when executed on the processing device, are configured to present the at least one functional device to the operating system of the processing device as a virtual functional device, and the third party software for the Unified Communication call is presented with the virtual functional device for the Unified Communication call, the processing device being configured to host the Unified Communication between two or more other processing devices, and

wherein the client software is further configured to provide data transformations based on a type of functional data from the at least one functional device to the processing device.

59. (Previously Presented) The system of claim 58, wherein the client software and the driver are configured to present a simulated speakerphone to the operating system to create a virtual microphone and a virtual speaker.

60. (Previously Presented) The system of claim 58, wherein the client software and the driver are configured to present a simulated videocam to the operating system to create a virtual videocam device.

61. (Previously Presented) The system of claim 58, wherein the client software is configured to provide video data, optionally obtained by screen scraping, directly to the base unit, wherein the base unit processes the video data.

62. (Currently Amended) The system of claim 58, wherein the ~~processing device processes~~ the functional data includes video data received from the base unit via the transmitter over the wireless connection.

63. (Currently Amended) The system of claim 62, wherein ~~processing~~ the data transformations of the video data comprises decoding and compositing or decrypting the video data.

64. (Previously Presented) The system of claim 58, wherein the at least one functional device which is presented to the operating system as a virtual functional device, is one or more of a data capturing device, a microphone, a speakerphone, a speaker, another display, a touchscreen, a projector, a camera, a video camera, and a webcamera.

65. (Previously Presented) The system of claim 58, further comprising means for encoding, optionally encrypting the data in the base unit or the processing device.

66. (Previously Presented) The system of claim 58, wherein the virtual functional device is presented to the unified communication between the two or more other processing devices.

67. (Cancelled)

68. (Previously Presented) The system of claim 58, further comprising at least one fixed or a configurable endpoint of the virtual functional device, wherein the at least one fixed or a configurable endpoint is a data source or a data sink which is configured to store or emit data of the virtual functional device.

69. (Currently Amended) A method for connecting a processing device to a functional device connected to or in a base unit of a communications network, the base unit having a transmitter and a first display device, the processing device having a memory, a second display device and an operating system, a third party software for a Unified Communication call, and a driver and a client software wherein, the client software, when executed by a processor on the processing device:

interacts directly with the base unit over a wireless connection and provides any simulations or translations, as required, to allow interaction between the first display device and the processing device, wherein the base unit transmits data over the wireless connection to the processing device,

the client software and a driver, when executed on the processing device, present the functional device to the operating system of the processing device as a virtual functional device,

third party software for a Unified Communication call is presented with the virtual functional device which it then uses for the call,

wherein the processing device hosts the Unified Communication call between two or more processing devices,

wherein the client software is further configured to provide data transformations based on a type of functional data from the at least one functional device to the processing device.

70. (Previously Presented) The method of claim 69, wherein the client software and the driver present a simulated speakerphone to the operating system thus creating a virtual microphone and a virtual speaker.

71. (Previously Presented) The method of claim 69, wherein the client software and a driver present a simulated videocam to the operating system thus creating a virtual videocam device.

72. (Currently Amended) The method of claim 69, wherein the functional data includes ~~client software of processing device provides~~ video data, optionally obtained by screen scraping, directly to the base unit where it is processed.

73. (Currently Amended) The method of claim 72, wherein the ~~process~~ data transformations comprises decoding and compositing or decrypting the video data and providing the video data to the first display device.

74. (Previously Presented) The method of claim 69, wherein the functional device which is presented to the operating system as the virtual functional device is any one or more of a data capturing device, a microphone, a speakerphone, a speaker, another display, a touchscreen, a projector, a camera, a video camera, a webcamera.

75. (Previously Presented) The method of claim 69, further comprising encoding, optionally encrypting the data.

76. (Previously Presented) The method of claim 69, wherein the virtual functional device is presented to the unified communication between the two or more other processing devices.

77. (Previously Presented) The method of claim 69, further exposing a same type of functional device to the processing device as is connected to the base unit which is presented to the operating system as a virtual functional device.

78. (Previously Presented) The method of claim 69, further comprising at least one fixed or a configurable endpoint of the virtual functional device, wherein the at least one fixed or a configurable endpoint is a data source or a data sink which stores or emits data of the virtual functional device.

79. (Previously Presented) The method of claim 70, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device.

80. (Cancelled)

81. (Previously Presented) The system of claim 58, wherein the interaction directly with the base unit further includes presenting the first display device to the processing device.

REMARKS

Applicant respectfully requests favorable reconsideration of this application in view of the above amendments and the following remarks.

Claims 58, 62, 63, 69, 72, and 73 are amended. Support for the amendments may be found, for example, at least on page 18, lines 16-23; page 19, lines 1-6; page 21, lines 14-17; page 25, lines 19-32; and page 28, line 13 to page 29, line 2 of the specification as originally filed.

No new matter has been added.

Claims 58 – 66, 68 – 79, and 81 are pending.

Applicant Summary of Interview

Applicant and Applicant's representative are gratefully appreciative of the opportunity to discuss the pending application with Examiner Misiura on June 26, 2023. During the interview, Applicant and the Examiner discussed proposed claim amendments and arguments of how the proposed claim amendments were distinguished over the cited references. No agreement was reached as to the patentability of the claims.

Claim Interpretation

Claim 65 is interpreted under 35 U.S.C. § 112(f) as including means-plus-function language. Applicant does not concede the correctness of this interpretation and defers the filing of any interpretation until it is necessary at a later time.

Claim Rejections - 35 U.S.C. § 103

Claims 58 – 66, 68 – 79, and 81 are rejected under 35 U.S.C. 103 as being unpatentable over Brands et al. (U.S. Patent Application Publication No. 2015/0121466) ("Brands") in view of Christison et al. (U.S. Patent No. 7,761,627) ("Christison"). Applicant respectfully traverses the rejection. However, without acquiescing to the merits of the rejection, but in order to advance prosecution, independent claims 58 and 69 are amended. While claims 58 and 69 differ in scope, claim 58 is discussed below with respect to similarly recited features.

Claim 58, as amended, recites at least in part that the client software is further configured to provide data transformations based on a type of functional data from the at least one functional

device to the processing device. Claim 58 further recites the processing device having a memory, a second display device, an operating system, a third party software for a Unified Communication call, a driver and a client software, when executed on the processing device, is configured to have the processing device interact directly with the base unit over a wireless connection.

Neither Brands nor Christison, taken alone or in combination, discloses or suggests the same combination of features as recited in claim 58.

As admitted on page 6 of the Final Office Action, "Brands does not specifically disclose presenting a functional device as a virtual functional device to the processing device." While Christison is relied on in the Office Action as disclosing such features, Applicant respectfully disagrees and further submits that Christison fails to disclose or suggest the features recited in amended claim 58.

Rather, Christison teaches performing operations on the protocol layer above that is agnostic of the actual data flows. For example, Christison teaches at column 3, lines 59-65 "Host wire Adapter (HWA) 410 connected to the host 400 as an external device." Christison further teaches at column 6, lines 15-16 that "the WUSB protocol for 'native' WUSB devices is relatively efficient." Christison also teaches at column 6, lines 32-37 that "An attached wired USB device either 1) is presented as a unique WUSB device with its own device address, or 2) is presented as a separate function on an already existing device." That is, Christison does not look at the type of data being transferred, but rather only generally teaches presenting wired USB devices as if they are 'native' WUSB devices.

In other words, while it is suggested in the Final Office Action that Christison teaches presenting a functional device as a virtual functional device to the processing device, as discussed during the interview, not only does Christison not teach that the processing device interacts directly with the base unit, since the WUSB is connected to the host, Christison does not teach the processing device being configured to have the processing device interact directly with the base unit and the client software being configured to provide data transformations based on a type of functional data from the at least one functional device to the processing device, as recited in claim 58. For example, the features recited in claim 58 are at least directed to creating different flows / behaviors dependent on the actual data modalities and interprets/processes the data accordingly. For example, as seen in Figs. 15 and 16 of the present application, for example,

in Fig. 15 (middle of page) shows that there are different data flows being done between the 'driver installed on PC', 'base unit' and 'peripheral'. That is, at the base unit, there is the 'data decode / processing / encryption' part that shows that the data isn't simply rearranged as in Christison, but that the functional data (e.g. audio stream, video stream) is actually interpreted and transformed. As such, there is no indication in Christison that data transformations are provided based on a type of functional data.

Furthermore, such deficiencies of Christison are not cured by the teachings of Brands. For example, even assuming, but not admitting that Brands teaches translations as suggested on pages 5-6 of the Office Action, there is no teaching in Brands that data transformations are provided based on a type of functional data. For example, in the present application, the data transformations are related to the functional data of the functional device, e.g., the images for a camera, the audio data for a microphone, etc., in which the transformations can include encoding/decoding, mixing, (de)multiplexing. There is no indication in Brands, however, that data transformations are provided based on a type of functional data.

Therefore, since neither Brands nor Christison, taken alone or in combination, teaches or suggests all of the features as recited in claim 58, the proposed modification of the invention of Brands in accordance with Christison fails to result in the same combination of features as recited in claim 58.

Moreover, there is no teaching or suggestion in Brands or Christison that would have prompted one having ordinary skill in the art to have combined the teachings of the cited references to result in the same combination of features as recited in claim 58. Rather, Brands and Christison are directed to different combination of features to overcome their respective prior art deficiencies. For example, Brands is directed mainly to the use of a peripheral device, e.g., plugged into a processing device, for communication between the processing device and the base unit; whereas, Christison is directed to using WUSB Wire Adapter systems. As such, there is no teaching or suggestion in either Brands or Christison that would have prompted or led one having ordinary skill in the art to result in the same combination of features as recited in claim 58.

Therefore, since neither Brands nor Christison, taken alone or in combination, teaches or suggests the same combination of features as recited in amended claim 58, obviousness of claim 58 cannot be established.

For at least the foregoing remarks, claim 58 is patentable over Brands and Christison. Claim 69 recites similar features as recited in claim 58 and is patentable over Brands and Christison for at least the same reasons as amended claim 58. The remaining claims depend on claims 58 and 69 and are patentable over Brands and Christison for at least the same reasons as claims 58 and 69. Applicant is not conceding the correctness of the rejection of the features not discussed herein. Applicant respectfully requests reconsideration and withdrawal of this rejection.

In view of the above, Applicant respectfully requests favorable reconsideration in the form of a Notice of Allowance. If any questions arise regarding this communication, the Examiner is invited to contact Applicant's representative listed below. Please charge any additional fees or credit any overpayment to Deposit Account No. 50-3478.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 S. 7th St., Suite 2700
Minneapolis, MN 55402
(612) 455-3800

Dated: July 12, 2023

By: ___/Thomas Lee/_____
Thomas Lee
Reg. No.: 66,396
TL/ajs

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**07/12/2023 11:24:10 AM ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Thomas Lee
PATENT CENTER #	62426398	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
Response_0018USWO.pdf		10	-	180 KB
Response_0018USWO-A.NE.pdf	(1-1)	1	Response After Final Action	90 KB
Response_0018USWO-CLM.pdf	(2-6)	5	Claims	117 KB
Response_0018USWO-REM.pdf	(7-10)	4	Applicant Arguments/Remarks Made in an Amendment	102 KB
AFCP_0018USWOT.pdf		2	After Final Consideration	221 KB

Program Request

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Response_0018USWO.pdf	AEB70BDBDC3D7946DFFCE2C9D9FDB8EDD9205FAFE5A140C C387F6CF918975D668A59ED831282756E5BF7A6960FE6D5245 CF26EBD1E4961EC5D7C0FB5C933994C
Response_0018USWO-A.NE.pdf	CCC48CB6F4FD4418F3C1D1183CC3931B55573C411EBEA1D6 CBA0E769803703B26750C47768DBBDBA2F14B7D22A3FA2504 D419EA9FB516DF71343DBB8423C1745
Response_0018USWO-CLM.pdf	7B196F398D918A57DB17AD70B4BC9E0A73D7B443D362BD72A 44F37C550FEC2265D01E501C4C0A6CA1514F2084FEF5B4BDC CEE8F00571A27504E36DA98D625EB1
Response_0018USWO-REM.pdf	A50F2DE1FDE0ED97F0E9FFCB14DC1E21BB0671B63CA6CCD DB1DD8F897AEC24BDE9652F075C00DF4CBCE39F83C20D949 655261D2FDB916934262E442BA9BA7E34
AFCP_0018USWOT.pdf	2EE1F3452BFCFBD1ECDD856D49BC315B98E09FD92678BD09 B0D507A5F14B660E7EA8D9831DE1A45CCDCF583211C725AF 564A02097FDFE7939F2C39319C17F7E5

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an

international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :Tawana Campbell

Sale Accounting Date:07/19/2023

Sale Item Reference Number	Effective Date
16771068	07/19/2023

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20237I836305015	1202	CLAIMS IN EXCESS OF 20	$200.00	Deposit Account

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

52835 7590 08/02/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER
MISIURA, BRIAN THOMAS

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 08/02/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	11/02/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

52835 7590 08/02/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	11/02/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2186	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

1045 of 1216

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 08/02/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 08/02/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/771,068	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 7/19/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 58-66,68-79 and 81 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 6/02/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☑ Other PTO-2323.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Examiner's Statement of Reasons for Allowance

Examiners Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claim 62 is amended to remove the redundant recitation of the word "the" in line 1.

Allowable Subject Matter

Claims 58-66, 68-79, and 81 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Independent claims 58 and 69 are amended to require: "wherein the client software is further configured to provide data transformations based on a type of functional data from the at least one functional device to the processing device".

Brands teaches processing device 31 comprising software for screen scraping video data and encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node (**Paragraphs 60, 63, and 256-259**). However, these transformations are performed on video data of the processing device,

not "functional data from the at least one functional device received by the processing device", as required by the independent claims.

Brands further teaches peripheral devices comprising software for receiving, decrypting, and decoding incoming arbitrary media content (**Paragraph 65**). Additionally, the base node comprises software for performing similar functions (**Paragraphs 243-253**).

Therefore, Brands does not teach nor suggest providing/performing data transformations by client software of the processing device 31 based on a type of functional data received from at least one functional device, when considered in combination with the other existing limitations of the claims.

- Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889 - (Direct Fax: 571-273-0889). The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/
Primary Examiner, Art Unit 2186

AFCP 2.0 Decision

Application No.	Applicant(s)	
16/771,068	RENARD et al.	
Examiner	**Art Unit**	**AIA (FITF) Status**
BRIAN T MISIURA	2186	Yes

This is in response to the After Final Consideration Pilot request filed 19 July 2023.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ The request is not the first proper AFCP 2.0 request submitted in response to the most recent final rejection.

   ☐ Other: _____

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☐ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☑ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action . See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other: _____

   Examiner Note: Please attach an interview summary when necessary as described above.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	10/06/2021	BTM
H04L12/12, 0428, 1813	10/06/2021	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, CPC, Inventor, and EAST prior art search	10/06/2021	BTM
Review prosecution/search history of parent application no. 15/858,668	10/06/2021	BTM
IDS Consideration, Update prior art search	03/15/2022	BTM
IDS Consideration	07/25/2022	BTM
IDS Consideration and update previous search	04/07/2023	BTM
Update previous search, IDS consideration, Interference search	07/20/2023	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	07/20/2023	BTM
H04M3	56-568	07/20/2023	BTM
H04L65	403-4061	07/20/2023	BTM

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	20 July 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office — Part of Paper No.: 20230720

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner) 20 July 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 5

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		12		23		34		45		56		67	20	78
	2		13		24		35		46		57	10	68	21	79
	3		14		25		36		47	1	58	11	69		80
	4		15		26		37		48	2	59	12	70	22	81
	5		16		27		38		49	3	60	13	71		
	6		17		28		39		50	4	61	14	72		
	7		18		29		40		51	5	62	15	73		
	8		19		30		41		52	6	63	16	74		
	9		20		31		42		53	7	64	17	75		
	10		21		32		43		54	8	65	18	76		
	11		22		33		44		55	9	66	19	77		

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	20 July 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office Part of Paper No.: 20230720

1057 of 1216

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L208	57	mimick$3 WITH endpoint$1	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/07/20 11:37 AM
L209	543	mimick$3 WITH peripheral$1	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/07/20 11:39 AM
L210	34	((US-20070233922-A1 OR US-20190205275-A1 OR US-20160092153-A1 OR US-20210191893-A1 OR US-20210176285-A1 OR US-20140181325-A1 OR US-20100115145-A1 OR US-20150169477-A1 OR US-20150089395-A1 OR US-20100302130-A1 OR US-20090198839-A1 OR US-20150121466-A1 OR US-20150263905-A1 OR US-20130067121-A1 OR US-20140362161-A1 OR US-20160125838-A1).did. AND PGPB.dbnm.) OR ((US-9183164-B2 OR US-7761627-B2 OR US-9201826-B2 OR US-7617342-B2 OR US-9804977-B2 OR US-9934168-B2 OR US-8756348-B2 OR US-10684972-B2 OR US-10031873-B2 OR US-9817772-B2 OR US-7180475-B2 OR US-8896656-B2 OR US-8316138-B2 OR US-9722986-B2 OR US-9083769-B2 OR US-9538138-B2).did. AND USPT.dbnm.) OR ((EP-3099009-A1 OR WO-2013037980-A2).did. AND FPRS.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	ADJ	ON	ON	2023/07/20 12:27 PM
L211	31	L210 AND (image$1 OR audio OR music OR video)	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/07/20 12:28 PM
L214	26	L210 AND (encod$3 OR decod$3 OR mix$3	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/07/20 01:48 PM

		OR multiplex$3 OR demultiplex$3 OR compress$3 OR encrypt$4 OR decompress$3 OR de-compress$3 OR decrypt$3 OR de-crypt$3)					

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N111	35517	H04L12/18-1895.cpc. OR H04M3/56-568.cpc OR H04L65/403-4061.CPC.	(US-PGPUB; USPAT)	ADJ	ON	ON	2020/01/21 03:25 PM
N117	1923	N111 AND ((encod$3 OR decod$3 OR mix$3 OR multiplex$3 OR demultiplex$3 OR compress$3 OR encrypt$4 OR decompress$3 OR de-compress$3 OR decrypt$3 OR de-crypt$3) WITH (audio OR video)).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/07/20 02:34 PM
N119	828	N117 AND ((meeting OR conference) AND virtual)	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/07/20 02:35 PM
N120	543	N119 AND @AD<"20171229"	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/07/20 02:35 PM

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1					

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	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	RENARD
	Art Unit	2186
	Examiner Name	MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Written Opinion issued in parallel Singapore patent application No. 11202005201Y, dated 10 May 2023, 8 pages provided	
	2	Office Action issued in U.S. Application No. 17/742166, mailed 9 May 2023	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	07/20/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	RENARD
Art Unit	2186
Examiner Name	MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

X See attached certification statement.

X The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-06-02
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

OK TO ENTER

/B.T.M/ 07/20/2023

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventorship:	RENARD	Examiner:	MISIURA, BRIAN THOMAS
Serial No.:	16/771068	Group Art Unit:	2186
Filed:	June 9, 2020	Docket No.:	21063.0018USWO
Title:	METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS		

CERTIFICATE OF TRANSMISSION.
I hereby certify that this paper is being transmitted by EFS Web to the United States Patent & Trademark Office on July 12, 2023.

By: /Thomas Lee/
Name: Thomas Lee

AMENDMENT AND RESPONSE AFTER FINAL

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Commissioner:

In response to the Final Office Action issued April 12, 2023, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/771,068	06/09/2020	2186	2080	21063.0018USWO	22	3

CONFIRMATION NO. 1088

REPLACEMENT FILING RECEIPT

52835
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

OC000000060291090

Date Mailed: 08/09/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Gauthier RENARD, Kuurne, BELGIUM;
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

Applicant(s)

BARCO N.V., Kortrijk, BELGIUM;

Assignment For Published Patent Application

BARCO N.V., Kortrijk, BELGIUM

Power of Attorney: The patent practitioners associated with Customer Number 52835

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/EP2018/086537 12/21/2018
which is a CIP of 15/858,668 12/29/2017 PAT 10,684,972

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/17/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/771,068**

Projected Publication Date: 06/24/2021

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Preliminary Class

710

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

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PATENT CENTER #	62844787	FILING DATE	06/09/2020
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CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

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DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
NPL2_Communication.pdf	3	Other reference-Patent/Application/Search Documents	72 KB
NPL1_Observations.pdf	1	Other reference-Patent/Application/Search Documents	27 KB
FR_WO2012128972A1.pdf	26	Foreign Reference	964 KB
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NPL2_Communication.pdf	ED106EEA1F94958A765D7147907EB66BB362345023C7CE87C378A1F88E2131378C8EF067A01FF58C4FDB7F8702CCB9A7AE827602F0C9EC7AFC1789D9E5136779
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FR_WO2012128972A1.pdf	A925A59E6FA6C2F42B0F8C60FF5279AAEDAB07BEA10256EA51C8190A9651B76D7B22ED6DA8F66AC8184A061F7C632631431B0305E82A320C232D856A328F8835
SB08_0018USWO.pdf	F327B2E04901444BE2B6E1010EE80713B5AC7056F190C54DE90CC720210ACE35EB46AF745DE24B7C67DF0648150B6F0013A56B67FB1CEEA9B93A37632575AA0B

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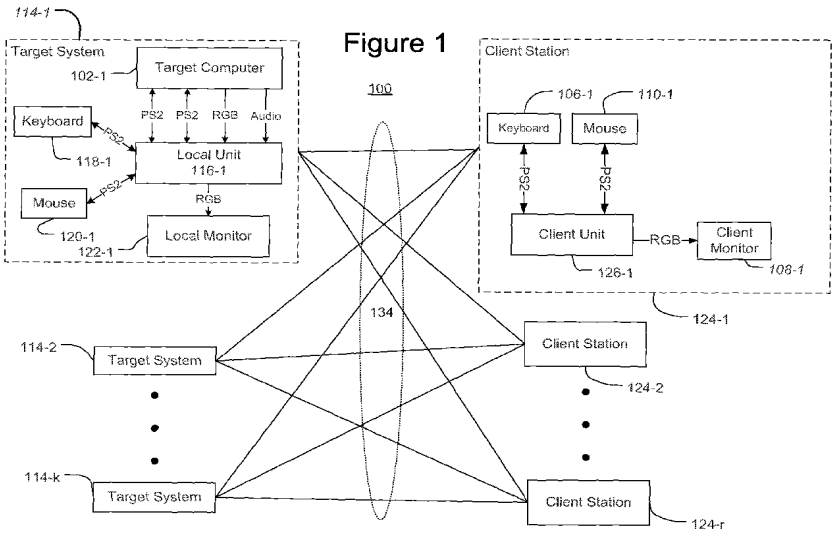
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(54) **Title**: METHOD AND SYSTEM FOR USB DEVICE VIRTUALIZATION

Figure 1



(57) **Abstract**: Methods and systems are provided to allow personal computer users to virtualize a local USB device so that they can remotely connect to a server and interact with the server as if the local USB device was physically connected to the server. They connect a remote USB target hardware device to the target system through a physical USB connection, and the device interacts with the local user's computer over a network. The target system is unaware that the USB device is not connected directly to the system through a physical connection, and the target system does not need special software to implement the remote USB device. The USB target hardware device connected to the target computer may be physically connected and disconnected.

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METHOD AND SYSTEM FOR USB DEVICE VIRTUALIZATION

[0001] This application is related to U.S. Patent Application No. 12/458,086, entitled "Method and System for Smart Card Virtualization," and U.S. Patent Application No. 13/070,175, entitled "Method and System for Audio Device Virtualization," which are hereby incorporated by reference.

FIELD OF INVENTION

[0002] This generally relates to USB devices and more particularly to virtualization of a USB device over a network.

BACKGROUND

[0003] USB (Universal Serial Bus) connections are commonly used to establish communication between devices and a host controller (usually personal computers). USB has replaced many varieties of serial and parallel ports, and can connect various computer peripherals such as mice, keyboards, digital cameras, printers, personal media players, flash drives, and external hard drives to a computer. For many of those devices, USB has become the standard connection method. USB was designed for personal computers, but it has become commonplace on other devices such as smartphones, PDAs and video game consoles, and as a power cord between a device and an AC adapter plugged into a wall plug for charging.

[0004] In another aspect of computing, systems exist to facilitate remote control of and access to a computer by an operator at a remote station. Such systems typically use a device or mechanism that enables an operator at a remote station to control aspects of a so-called target (or local) computer. More particularly, such systems typically allow a remote station to provide mouse and keyboard input to the target computer and further allow the remote

station to view the video display output of the target computer. These types of systems are typically called keyboard-video-mouse (KVM) systems.

[0005] Remote KVM systems allow a user to interact with a computer anywhere in the world via the keyboard, mouse, and video, as if they were seated right next to the computer. In addition to virtualization of the keyboard, mouse and video, storage media such as CD/DVD-ROMs, flash drives, and floppy disks have also been virtualized. As such, a user can provide access to data on a disk to a server anywhere in the world.

[0006] Some conventional systems virtualize USB devices over a network. In such systems, a user may use a USB device connected to a remote computer as if it was connected to the local computer. Conventional USB-over-IP systems allow a user to use a USB device in one location while it is virtualized from a PC in another location and provide special software installed and running on the target computer to interact with a USB device. However, this software running on the target must be specifically tailored, requires greater overhead and infrastructure, and provides less flexibility. These products also require special software be installed on both the local PC and the remote PC. Installing software on the client PC may be acceptable, but installing it on the target PC is typically not as it may violate the security of the computer to be accessed.

[0007] The remote target computer does not typically have a USB connection to a local USB device without the installation of software on the target computer. Accordingly, there is a desire for a system that provides virtualization of USB device use while not requiring special software to do so.

SUMMARY

[0008] In accordance with methods and systems consistent with the present invention, a data processing system for virtualization of a USB device is provided, comprising a target computer configured to send and receive USB device data to a locally connected device, and a client computer locally

connected to a USB device. The data processing also comprises a USB virtualization device locally physically connected to the target computer, configured to receive USB device data from the client USB device over the network, process the received USB device data, and send the processed USB device data to the locally connected target computer through a physical USB connection.

[0009] In one implementation, a USB virtualization device is provided, comprising a network interface configured to interact with a client computer to send USB device data and receive USB device data over a network. The USB virtualization device further provides a USB input/output interface configured to physically connect to a target computer in a USB port, and to receive USB data from the target computer and send USB device data to the target computer. The USB virtualization device also provides a processor configured to translate the received USB device data from the physical USB input/output interface for output to the network interface, and to translate the received USB device data from the network interface for output to the physical USB input/output interface.

[0010] In another implementation, a method in a data processing system for virtualization of a USB device is provided, comprising receiving USB device data from the USB device physically connected to a client computer, sending the received USB device data over a network, and receiving USB device data by a USB virtualization device from the client computer over the network. The method further comprises processing the received USB device data, and sending the processed USB device data to a target computer locally connected to the USB virtualization device through a physical USB connection.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 illustrates an exemplary KVM computer system in accordance methods and systems consistent with the present invention.

[0012] Figure 2 illustrates an exemplary target computer system consistent with systems and methods consistent with the present invention.

[0013] Figure 3 depicts a USB virtualization device in a computer network in accordance with methods and systems consistent with the present invention.

[0014] Figure 4 illustrates a flowchart of exemplary steps of a method for USB device virtualization in a computer network in accordance with methods and systems consistent with the present invention

DETAILED DESCRIPTION

[0015] Methods and systems in accordance with the present invention allow personal computer users to virtualize a local USB device so that they can remotely connect to a server and interact with the server as if the local USB device was physically connected to the server. They allow USB devices to be virtualized so that a remote user may attach their USB device to their local PC and then virtualize the USB device so that it can be used with a computer anywhere in the world. In one implementation, they connect a remote USB device virtualization hardware device to the target computer through a physical connection, such as a USB connection, and the device interacts with the local user's computer and USB device over a network. As such, the target system is unaware that the actual USB device is not connected directly to the system through a physical connection, and the target system does not need special software to implement the remote USB device. The USB target device connected to the target computer may be physically connected and disconnected, and the target computer interacts with the device as if it was the USB device, thereby avoiding the installation of special software on the target computer. In these systems, USB devices may be connected to a remote target computer without the target computer knowing that the USB device is not locally connected.

[0016] Methods and systems in accordance with the present invention do not require special software on a remote PC. Through the use of hardware device at the remote location, the connection to the remote PC may be through a normal USB device connection. The device driver and middle layer software for the USB device is typically already installed with the base operating system running on the remote PC. No more software is needed on the remote PC than would be required if a user connected a USB device directly to the remote PC. For the target system, the implementation over the network appears the same as a local USB device. For example, Windows or Linux is already configured to accept a plug in USB device, and do not require any additional software on the host or target. The operating system operates as if a physical USB is plugged into the target computer.

[0017] The lack of a need to have special software on the target computer provides the ability to be flexible, generic and used by a variety of clients and infrastructures with minimal infrastructure requirements. The target computer does not have to be a particular target or have particular software, and as a result, less overhead needs to be developed for implementation.

[0018] In the discussion that follows, the computer or system to which the USB device is being virtualized is generally referred to as the target computer or the target system. In some instances, the target computer is also referred to as the local computer, however, components local to the client computer may also be referred to as local. The system that is connected to the USB device to be virtualized is generally referred to herein as the client system.

[0019] Figure 1 depicts an exemplary KVM computer system in accordance methods and systems consistent with the present invention. A KVM system 100 is shown in Figure 1, where one or more target systems 114-1 . . . 114-k are controlled or accessed by one or more client stations 124-1, 124-2, . . ., 124-r (generally 124). Each target system 114 includes a target computer 102 with associated and attached local unit 116. Each client station 124 generally includes a client unit 126, a keyboard 106, a video monitor 108,

and a mouse (or similar point-and-click device) 110, although some client stations may only include a video display 108 and a client unit. Operation of a particular target computer 102-i may be remotely viewed on the video monitor 108 of any of the client stations 124, and the keyboard 106 and mouse 110 of the client station 124 may be used to provide keyboard and mouse input to the target computer 102-i. As shown in Figure 1, in a KVM system 100, a client station 124 is able to control or access more than one target computer. Note that the lines drawn between target systems and client stations in Figure 1 represent potential (and not necessarily actual) wired or wireless (*e.g.*, RF) links between those sides. Thus, each target computer 102 may be controlled or accessed by more than one client station 124, and each client station 124 may control more than one target computer 102. The client station 124, in one implementation, may be located within several hundred feet of the target system 114.

[0020] Furthermore, in certain contexts, the target system 114 is considered to be a video transmitter or sending unit, and the client system 112 is the video receiving unit or receiver, although both units transmit and receive. Generally, video travels from target system 114 to client station 124, while keyboard and mouse data move from client station to target system.

[0021] As shown in Figure 1 the local or target system 114 includes a target computer 102 and an associated local unit 116. The local system 114 may also include a keyboard 118, a mouse (or other point-and-click-type device) 120 and a local monitor 122, each connected to the local unit 116 directly. The client station 124 includes a client unit 126. The local or target computer 102 may be a computer, a server, a processor or other collection of processors or logic elements. Generally, a target computer may include any processor or collection of processors. By way of example, a target computer may be a processor or collection of processors or logic elements located (or embedded) in a server, a desktop computer (such as a PC, Apple Macintosh or the like), a kiosk, an ATM, a switch, a set-top box, an appliance (such as a

television, DVR, DVD player and the like), a vehicle, an elevator, on a manufacturing or processing production line. A collection of target computers 102 may be a collection of servers in a rack or some other collection, they may be independent of each other or connected to each other in a network or by some other structure. The local and client monitors 122, 108, may be digital or analog.

[0022] The local unit 116 is a device or mechanism, *e.g.*, a printed circuit board ("PCB"), that is installed locally to the target/local computer 102. This device may be close to, but external to the computer, or may be installed inside the computer's housing. Regardless of the positioning of the local unit 116, in one implementation, there is a direct electrical connection between the target computer 102 and the local unit 116.

[0023] Various components on the local / target system 114 communicate wirelessly or via a wired connection with components on the client station 124 via a wireless connection link 134. In one implementation, the wireless connection or link 134 follows the IEEE 802.11 standard protocol, although one skilled in the art will realize that other protocols and methods of communication are possible.

[0024] The local unit 116 receives local mouse and keyboard signals, *e.g.*, USB or PS2 signals. These signals are provided by the local unit 116 to the target computer 102. The target computer 102 generates video output signals, *e.g.*, RGB (Red, Green, Blue) signals, which are provided to the local unit 116 which, in turn, provides the signals to drive the local monitor 122. The target computer 102 may also generate audio output signals which are provided to the local unit 116. As noted, the target computer 102 need not have a keyboard, mouse or monitor, and may be controlled entirely by a client station 124.

[0025] Local unit 116 transmits image data for transmission to a client station 124 (*e.g.*, via client unit 126). Some or all of the data may be compressed before being transmitted. Additionally, local unit 116 may receive

mouse and keyboard data (from a client station 124), which is then provided to the local / target computer 102. The target computer 102 may execute the data received and may display output on its local monitor 122.

[0026] The client station 124 receives video data from the local unit 116 of the target computer 102, via a wired or wireless connection (*e.g.*, 802.11a wireless connection 134). The client unit 126 receives (possibly compressed) video data (not all of the data need be compressed) from the local unit 116. The client unit 126 decompresses (as necessary) the video data from the local unit 116 and provides it to the appropriate rendering device, *e.g.*, to the client monitor 108, which displays the video data. Additionally, client mouse 110 and keyboard 106 may be used to generate appropriate signals (*e.g.*, PS2 signals or USB) that may be transmitted via client unit 126 to local unit 116 for execution on target computer 102.

[0027] Figure 2 illustrates an exemplary client computer system consistent with systems and methods consistent with the present invention. Client computer 124 includes a bus 202 or other communication mechanism for communicating information, and a processor 204 coupled with bus 202 for processing the information. Client station 124 may also include similar components as client computer 124, including some or all of the components mentioned. Client computer 124 also includes a main memory 206, such as a random access memory (RAM) or other dynamic storage device, coupled to bus 202 for storing information and instructions to be executed by processor 204. In addition, main memory 206 may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor 204. Main memory 206 includes a program 212 for implementing processing consistent with methods and systems in accordance with the present invention. Client computer 124 further includes a Read-Only Memory (ROM) 208 or other static storage device coupled to bus 202 for storing static information and instructions for processor 204. A storage device

210, such as a magnetic disk or optical disk, is provided and coupled to bus 202 for storing information and instructions.

[0028] According to one embodiment, processor 204 executes one or more sequences of one or more instructions contained in main memory 206. Such instructions may be read into main memory 206 from another computer-readable medium, such as storage device 210. Execution of the sequences of instructions in main memory 206 causes processor 204 to perform processes described herein. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory 206. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions. Thus, embodiments are not limited to any specific combination of hardware circuitry and software.

[0029] Although described relative to main memory 206 and storage device 210, instructions and other aspects of methods and systems consistent with the present invention may reside on another computer-readable medium, such as a floppy disk, a flexible disk, hard disk, magnetic tape, a CD-ROM, magnetic, optical or physical medium, a RAM, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, or any other medium from which a computer can read, either now known or later discovered.

[0030] Figure 3 depicts a virtual USB device controller 300 in a computer network in accordance with methods and systems consistent with the present invention. As shown on the Figure, the client station 124 includes a client operating system 302 which may connect to external devices, *e.g.*, USB devices 304 or any other suitable component. A client user plugs their USB device 304 into the USB input on the client station 124 so that it can interact remotely with the target computer 102.

[0031] The target operating system 310 on the target computer 102 may be a normal operating system. Further, the target computer 102 may include

one or more USB connections and may connect to USB devices or any other suitable components.

[0032] The client operating system 302 also includes a USB device virtualization client component 306, which may be software on the client computer 124 which interacts with the remote target virtual USB device controller 300, which in one implementation, is a hardware device. The client computer 124 may download the USB device virtualization client component 306. The USB device virtualization client component 306 communicates with the USB device virtualization server 308 remotely over a network using TCP/IP, and interacts with the local USB device 304.

[0033] In one implementation, the virtual USB device controller 300 is a hardware component that includes the USB device virtualization server 308 which may be firmware, software, or hardware for interacting remotely with the USB device virtualization client component 306 and locally with the target computer 102 and target computer operating system 304. This virtual USB device controller 300 may be plugged into the target computer 102 with a physical connection, such as a USB connection. In one implementation, the USB device virtualization server 308 communicates with the USB device virtualization client component 306 in the Avocent Virtual USB Protocol (AVUP) developed by Avocent, Inc. However, other suitable protocols and methods are possible.

[0034] When the USB device 304 is plugged into the client system 124, it connects to a USB host 314 on the client system 124. The USB host may, for example, be a combination of hardware and software. At this point, the system may ask the user whether to use the USB device 304 locally or whether to redirect it to a remote target computer 102. When the USB device 304 is plugged in and the user has indicated virtualization of the device, the USB device virtualization client 306 sends a notification to the USB device virtualization server 308 that a new USB device 304 has been attached and that it is virtualizing the new USB device. In this notification, the USB device

virtualization client 306 transmits the type of device it is, the number of endpoints (*e.g.*, how many different types of functions it can perform) and begins a bi-directional flow of information including status and data and requests for status and data, pursuant to the USB protocol.

[0035] Upon receiving the notification of the new USB device 304, the USB device virtualization server 308 on the virtual USB device controller 300 plugged into the target computer 102 configures its USB device 316 that interfaces with the USB host 312 on the target computer. The USB device 316 may be a physical component that plugs into the USB jack on the target computer 102 and also comprises configurable software. The software on the USB device 316 is configured to emulate the USB device 304 that is being virtualized on the client computer 124. When signals are received from the USB device 304 on the client computer 124, this USB device 316 on the virtual USB device controller 300 emulates the signals received and sends those signals to the target computer 102 via the USB host 312. It also receives USB signals from the target computer 102 and sends them to the USB device 304 on the client computer 124 via the USB device virtualization client 306.

[0036] When the USB host 312 on the target computer 102 requests status, for example, the USB device virtualization client 306 responds back with the status. USB device virtualization client 306 may also inform the target computer 102 that it has data to send, and the target computer may respond to proceed with the transmission.

[0037] The virtual USB device controller 300 receives information for USB device interaction, such as USB device commands or packets, from the target operating system 310 and they are processed by the USB device virtualization server 308 on the virtual USB device controller 300. The USB device virtualization server 308 processes, translates and transmits the USB device commands in the AVUP protocol over TCP/IP to the USB device virtualization client component 306. The virtual USB device controller 300 includes a processor that runs USB device virtualization server software 308,

and that processor may also have a USB device 316 built in. It uses a network connection to connect to the client computer 124, and a USB device connection to connect to the target computer 102. The virtual USB device controller 300 translates USB device commands and responses from the network format to the USB format and vice versa.

[0038] For example, the USB device virtualization server 308 receives the USB device command from the target computer 102, translates the command and sends it over TCP/IP to the USB device virtualization client component 306. The response to the USB device command traverses back from the USB device virtualization client component 306 to the USB device virtualization protocol server 308 on the virtual USB device controller 300, and through the physical USB connection to the target computer 102. In one implementation, the USB device commands may conform to the USB specification for USB devices 304.

[0039] On the client system 124, the USB device virtualization client component 306 uses services provided by the client operating system 302, such as the USB host 314, to send the USB device command out to the physical USB device 304 connected to the client computer.

[0040] Figure 4 illustrates a flowchart of exemplary steps of a method for USB device virtualization in a computer network in accordance with methods and systems consistent with the present invention. First, a virtual USB device controller 300 is plugged into a target computer 102 via a physical connection (such as its USB device 316) and connects with the USB host 312 (step 402). The target operating system 310 recognizes the USB-connected virtual USB device controller 300 as a local USB device and operates accordingly (step 404). Additionally, a USB device 304 to be virtualized is plugged into the client computer 124 via the USB host 314 on the client computer (step 406). Upon prompting by the system, the user indicates that they would like the USB device 304 to be virtualized to the target computer 102 (step 408).

[0041] The USB device 304 attached to the client computer 124 interfaces with the USB host 314 which passes the USB device information to the USB device virtualization client component 306 (step 410). Initially, these commands may indicate the presence and identification of the device and may later include relevant status and data. Further, the USB device virtualization client component 306 processes the received USB device command and sends it via TCP/IP over the network to the USB device virtualization server 308 on the virtual USB device controller 300 (step 412). Then, the USB device virtualization server 308 translates the received USB device command to the USB format to be outputted to the target operating system 310 on the target computer 102 (step 414). The USB device virtualization server 308 also configures the USB device 316 on the virtual USB device controller 300 to emulate the USB device 304 locally connected to the client computer system 124 (step 416). The USB device 316 then sends the USB command information to the target operating system 310 via the USB host 312 to which it is connected (step 418).

[0042] The target operating system 310 may respond or initiate USB interaction by transmitting a USB device command, *e.g,* status or data request, over the USB connection to the virtual USB device controller 300 as it would to a physically connected local USB device 304 (step 420). Next, the USB device 316 on the virtual USB device controller 300 receives the USB device command and passes it to USB device virtualization server 308 (step 422). Furthermore, the USB device virtualization server 308 on the virtual USB device controller 300 receives the USB device command and translates it to a protocol used by the USB device virtualization server 308 and the USB device virtualization client component 306, such as the AVUP protocol (step 424).

[0043] The USB device virtualization server 308 transmits the translated USB device command over TCP/IP to the remote client computer 124 (step 426). The remote client computer's operating system 302 receives the translated USB device command and passes it to the USB device virtualization

client component 306 (step 428) to translate it into USB to be outputted to the connected USB device 304.

[0044] The foregoing description of various embodiments provides illustration and description, but is not intended to be exhaustive or to limit the invention to the precise form disclosed. Modifications and variations are possible in light of the above teachings or may be acquired from practice in accordance with the present invention. It is to be understood that the invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

CLAIMS

What is claimed is:

1. A data processing system for virtualization of a USB device, comprising:
a target computer configured to send and receive USB device data to a locally connected device;
a client computer locally connected to a USB device;
a USB virtualization device locally physically connected to the target computer, configured to:
receive USB device data from the client USB device over the network;
process the received USB device data; and
send the processed USB device data to the locally connected target computer through a physical USB connection.

2. The data processing system of claim 1, wherein the USB virtualization device is further configured to:
receive USB device commands from the locally connected target computer;
process the commands to be transmitted over the network; and
send the processed USB device commands to the client computer over the network.

3. The data processing system of claim 1, wherein the target computer interacts with the USB virtualization device in the same way the target computer interacts with a locally connected USB device.

4. The data processing system of claim 1, wherein all software for remote USB device interaction is on the USB virtualization device and the client computer.

5. The data processing system of claim 1, wherein the client computer is a KVM client that controls the target computer.

6. The data processing system of claim 1, wherein the client computer comprises a program configured to interact with the locally connected USB device and the USB vitualization device.

7. The data processing system of claim 1, wherein communications over the network are TC/PIP communications.

8. A USB virtualization device, comprising:

a network interface configured to interact with a client computer to send USB device data and receive USB device data over a network;

a USB input/output interface configured to physically connect to a target computer in a USB port, and to receive USB data from the target computer and send USB device data to the target computer; and

a processor configured to:

translate the received USB device data from the physical USB input/output interface for output to the network interface; and

translate the received USB device data from the network interface for output to the physical USB input/output interface.

9. The USB virtualization device of claim 8, wherein the target computer interacts with the USB virtualization device in the same way the target computer interacts with a locally connected USB device.

10. The USB virtualization device of claim 8, wherein the client computer is a KVM client that controls the target computer.

11. The USB virtualization device of claim 8, wherein the client computer comprises a program configured to interact with the locally connected USB device and the USB virtualization device.

12. The USB virtualization device of claim 8, wherein the network interface communicates using TCP/IP.

13. The USB virtualization device of claim 8, wherein the USB virtualization device is a hardware device.

14. A method in a data processing system for virtualization of a USB device, comprising:

receiving USB device data from the USB device physically connected to a client computer;

sending the received USB device data over a network;

receiving USB device data by a USB virtualization device from the client computer over the network;

processing the received USB device data; and

sending the processed USB device data to a target computer locally connected to the USB virtualization device through a physical USB connection.

15. The method of claim 14, wherein the USB virtualization device interacts with the target computer in the same way as a locally connected USB device.

16. The method of claim 14, wherein all software for remote USB device interaction is on the USB virtualization device and the client computer.

17. The method of claim 14, wherein the client computer is a KVM client that controls the target computer.

18. The method of claim 14, wherein the client computer comprises a program configured to interact with the locally connected USB device and the USB virtualization device.

Figure 1

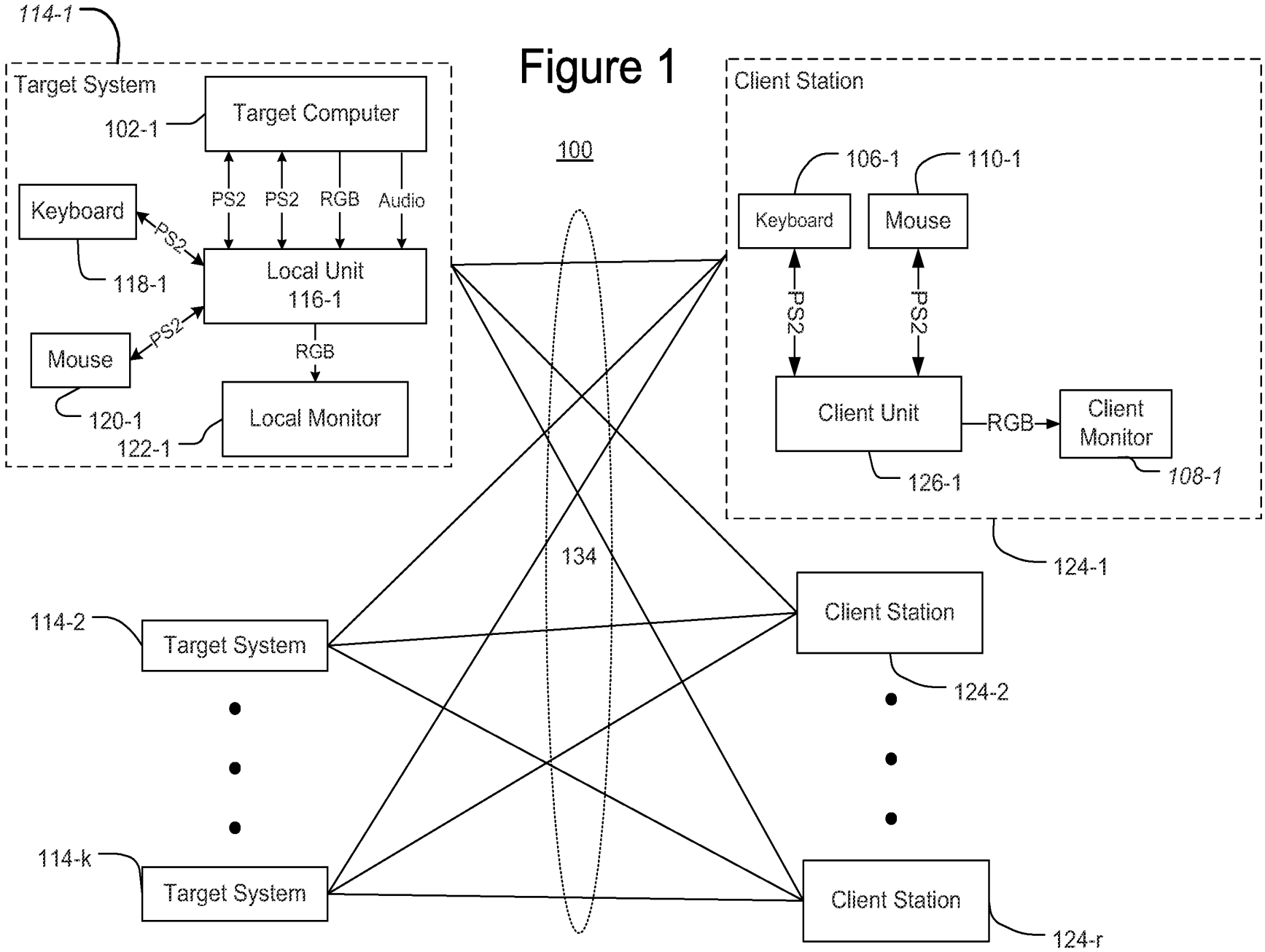

114-1
Target System
102-1
Target Computer
PS2
PS2
RGB
Audio
Keyboard
PS2
118-1
Local Unit
116-1
PS2
Mouse
RGB
120-1
Local Monitor
122-1
100
Client Station
106-1
110-1
Keyboard
Mouse
PS2
PS2
Client Unit
RGB
Client Monitor
126-1
108-1
124-1
134
114-2
Target System
Client Station
124-2
114-k
Target System
Client Station
124-r

Figure 2

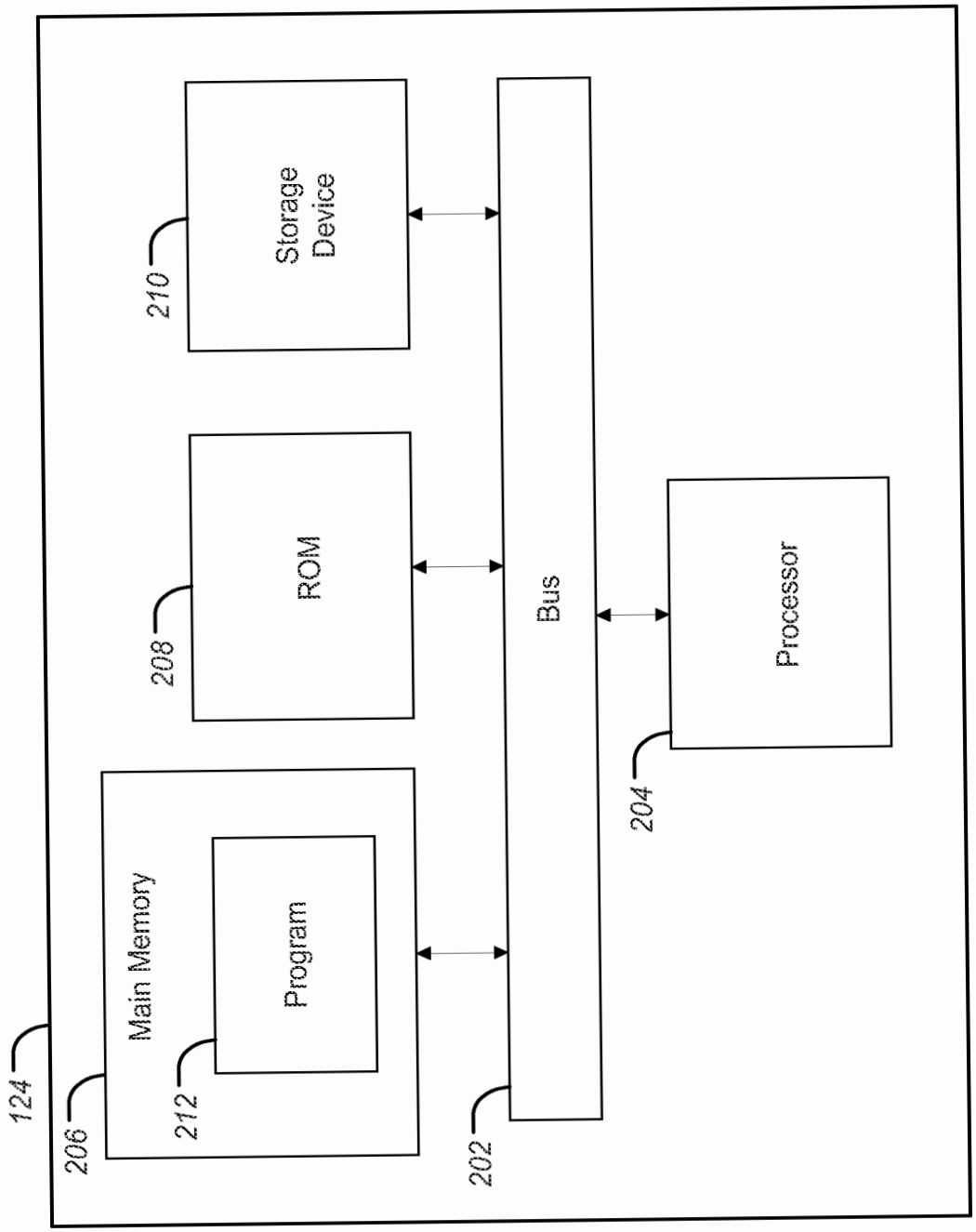

124
206
Main Memory
212
Program
202
Bus
204
Processor
208
ROM
210
Storage Device

Figure 3

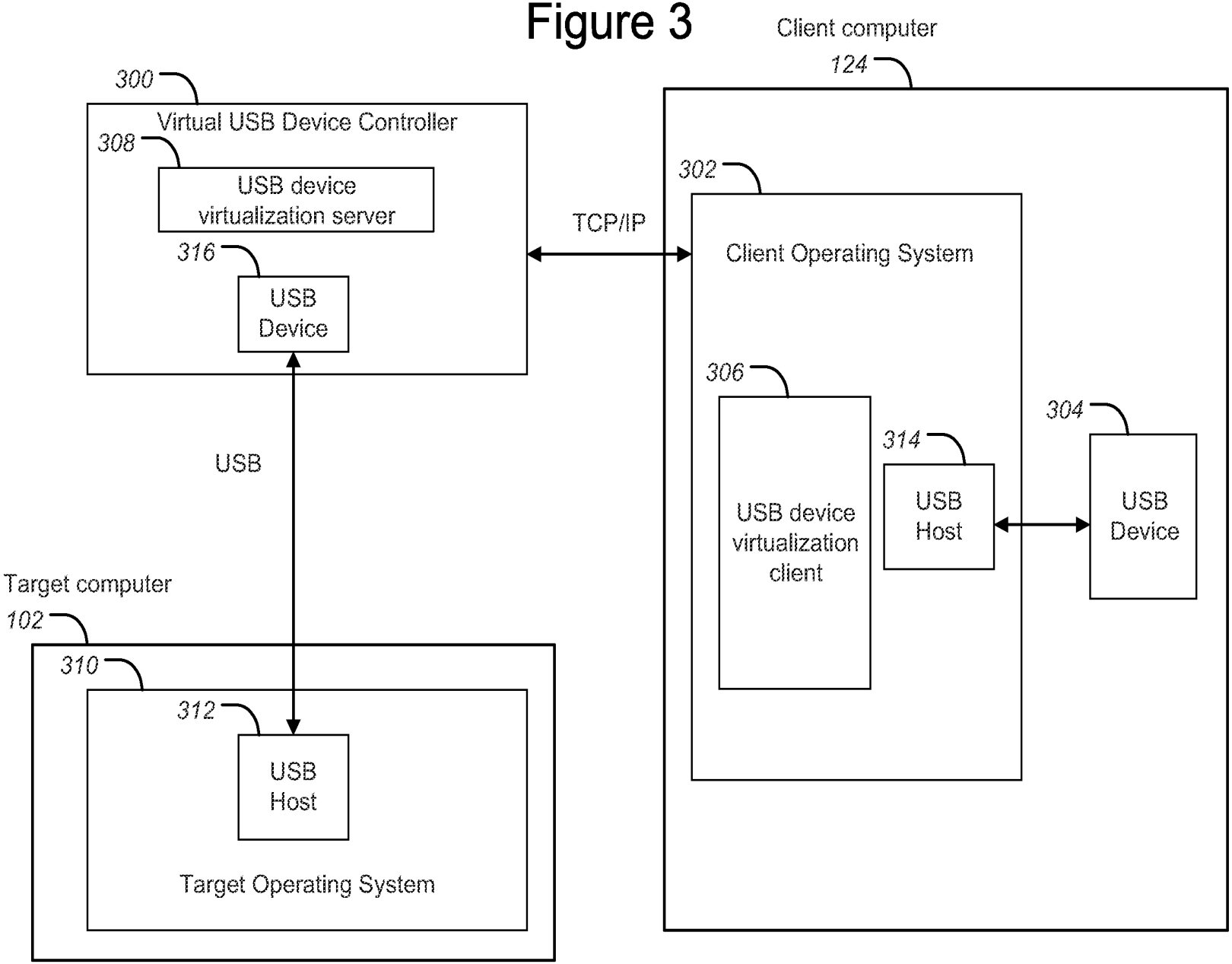
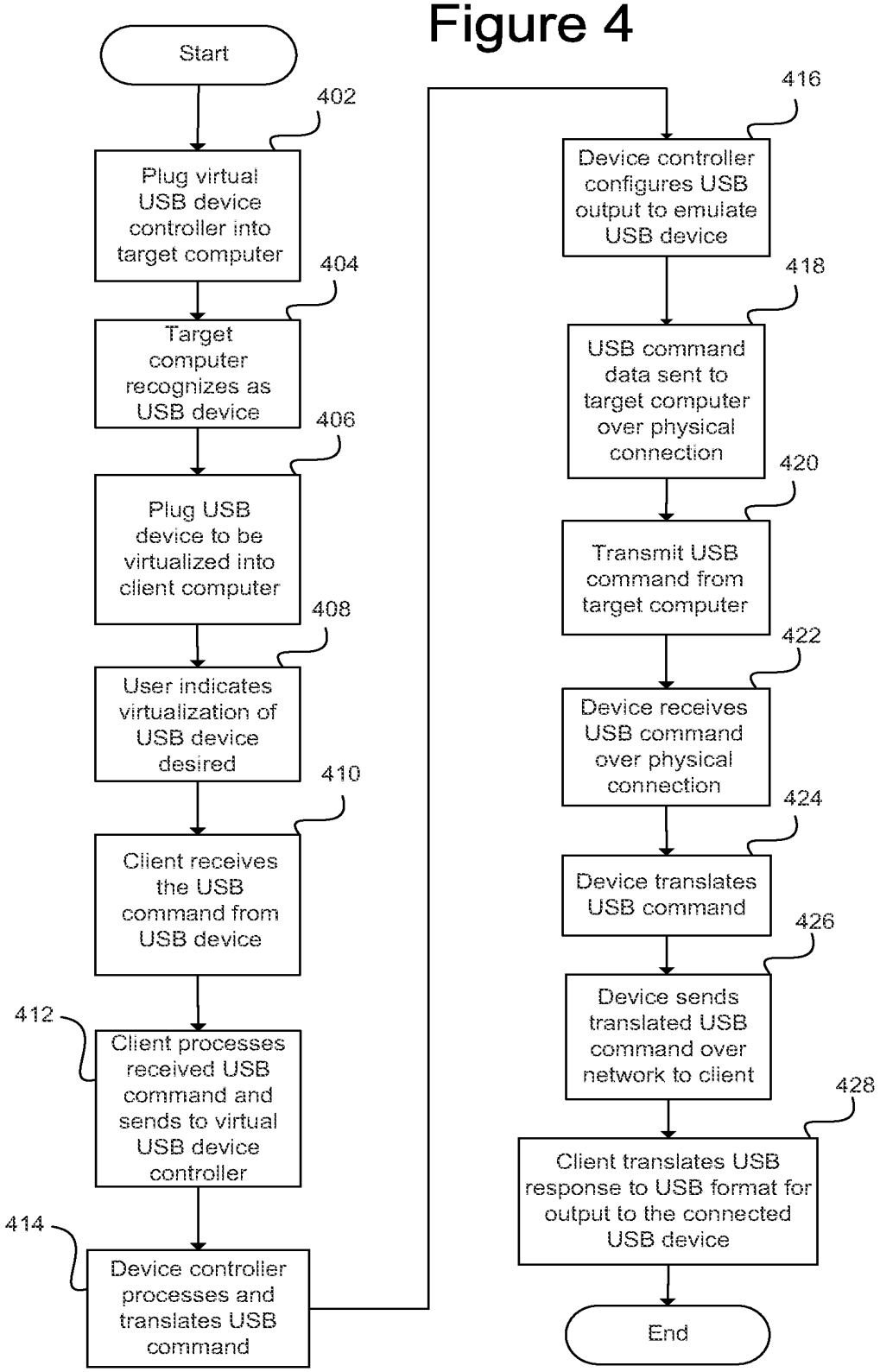

Client computer
124
300
Virtual USB Device Controller
308
USB device virtualization server
316
USB Device
TCP/IP
302
Client Operating System
306
USB device virtualization client
314
USB Host
304
USB Device
USB
Target computer
102
310
312
USB Host
Target Operating System

Figure 4


Start
402
Plug virtual USB device controller into target computer
404
Target computer recognizes as USB device
406
Plug USB device to be virtualized into client computer
408
User indicates virtualization of USB device desired
410
Client receives the USB command from USB device
412
Client processes received USB command and sends to virtual USB device controller
414
Device controller processes and translates USB command
416
Device controller configures USB output to emulate USB device
418
USB command data sent to target computer over physical connection
420
Transmit USB command from target computer
422
Device receives USB command over physical connection
424
Device translates USB command
426
Device sends translated USB command over network to client
428
Client translates USB response to USB format for output to the connected USB device
End

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US12/28443

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **G06F 15/16**(2006.01),**13/00**(2006.01)

USPC: 710/33;709/217,229
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 710/33; 709/217, 229

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2008/0071950 A1 (JUSTICE) 20 March 2008 (20.03.2008), see entire document.	1-4, 6, 8-9, 11, 13-16, 18 --- 5, 7, 10,1 12, 17
Y	US 2008/0168118 A1 (HICKEY et al.) 10 July 2008 (10.07.2008), see entire document.	5, 7, 10, 12, 17

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 May 2012 (11.05.2012)	23 MAY 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer William Krynski Telephone No. 571-272-1700

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT	International application No. PCT/US12/28443

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Continuation of B. FIELDS SEARCHED Item 3:
US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB: scragg, anthony, siegman, craig, straub, michael, roca, agustin, audio, virtual, USB, networ, emulat, server, remote, client, target, host

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Primary Examiner
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BELGIQUE

Application No.	Ref.	Date
18 833 045.0 - 1216	PAT86146EP00	01.09.2023
Applicant Barco n.v.		

Communication pursuant to Article 94(3) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(2) EPC.

You are invited to file your observations and in sofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 126(2) and 131(2) and (4) EPC. One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (R. 50(1) EPC).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the Examining Division requesting that you correct this deficiency (R. 137(4) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Art. 94(4) EPC).

Registered Letter

Mircescu, Alexander
Primary Examiner
For the Examining Division

Enclosure(s): 1 page/s reasons (EPO Form 2906)

The examination is being carried out on the **following application documents**

Description, Pages

1A	filed with entry into the regional phase before the EPO	
1-39	filed in electronic form on	09-06-2023

Claims, Numbers

1-12	filed in electronic form on	09-06-2023

Drawings, Sheets

1/19-19/19	as published

With the following amendments to the above-mentioned documents proposed by the division

Description, Pages

Delete Previous: 40

1 With respect to the present set of claims, third party observations have been filed on 27. July 2023. These observations were sent to the applicant.

2 The observations introduced a new document:

WO 2012/128972 A1, which is also with the applicant.

3 The examiner has the preliminary opinion, that the subject matter of claims 1, 11, and 12 is not novel (Art 52(1) EPC and Art 54(1),(2) EPC) with respect to the disclosure of WO 2012/128972 A1, as indicated point 4 of said observations.

4 Furthermore, the examiner has the preliminary opinion, that the subject matter of claims 1 and 10 contravenes the requirements of Art 123(2) EPC, as indicated in point 6.1 of said observations.

5 Furthermore, the examiner has the preliminary opinion, that the subject matter of claim 1 contravenes the clarity requirements of Art 84 EPC, as indicated in point 6.3 of said observations.

6 The applicant is kindly requested to provide arguments or to amend said claims accordingly, in order to achieve a set of claims complying with the EPC.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA, BRIAN THOMAS
Attorney Docket Number	21063.0018USWO

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2012128972	WO	A1	2012-09-27			☐

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USWO

	1	Observations by a third party in European Application No. 18833045.0, dated August 2, 2023	☐
	2	Communication issued in European Application No. 18833045.0, dated September 1, 2023	☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-09-22
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**09/21/2023 05:46:32 PM ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	62844787	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	06/09/2020
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 503478	**E20239KH47409948**	**Yanling Cottle**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	**$260.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement

Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 10/04/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER
MISIURA, BRIAN THOMAS

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
10/04/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 16/771,068	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 9/21/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 58-66,68-79 and 81 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 9/21/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	MISIURA, BRIAN THOMAS
Attorney Docket Number	21063.0018USWO

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2012128972	WO	A1	2012-09-27			☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
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	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	MISIURA, BRIAN THOMAS
	Attorney Docket Number	21063.0018USWO

	1	Observations by a third party in European Application No. 18833045.0, dated August 2, 2023	☐
	2	Communication issued in European Application No. 18833045.0, dated September 1, 2023	☐

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	09/29/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

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Art Unit	2186
Examiner Name	MISIURA, BRIAN THOMAS
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-09-22
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

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First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Office Action issued in U.S. Application No. 17/664,147, dated September 13, 2023	☐

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Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-10-08
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**10/08/2023 07:24:00 PM ET**	**21063.0018USWO**

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METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

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CONFIRMATION #	1088	FILED BY	Yanling Cottle
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CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

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CARD / 1021	**E202308J 24336813**	**Yanling Cottle**

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PATENT AND TRADEMARK OFFICE

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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

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INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
OA.pdf	9	Other reference-Patent/Application/Search Documents	514 KB
SB08_0018USWO.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

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SB08_0018USWO.pdf	DAFB13775058B8D956A84E029F10B293528803ED872E0FEBE5F932B8A55999CB2850D3E7FF35365CC1C553AE6973B74C0FB28E28C349DDCD14E645486BD4DFBA

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 10/18/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
10/18/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 16/771,068	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 10/8/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 58-66,68-79 and 81 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 10/8/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Office Action issued in U.S. Application No. 17/664,147, dated September 13, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	10/13/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(**Not for submission under 37 CFR 1.99)**

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-10-08
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**11/01/2023 12:59:04 PM ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	63133330	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	06/09/2020
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E2023A1C59405709**	**Yanling Cottle**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1820	REQUEST FOR CONTINUED EXAMINATION (RCE)- 2ND AND SUBSEQUENT REQUEST (SEE 37 CFR 1.114)	2000.00	1	2000.00
			TOTAL AMOUNT:	**$2,000.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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UNITED STATES
PATENT AND TRADEMARK OFFICE

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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**11/01/2023 12:59:04 PM ET**	**21063.0018USWO**

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METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

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PATENT CENTER #	63133330	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SB08_0018USWO.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB
RCE_0018USWO.pdf	3	Request for Continued Examination (RCE)	1628 KB
NPL_CHAE.pdf	14	Non Patent Literature	10199 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
SB08_0018USWO.pdf	F12BC9B72D9644D84AB75FAF769EB69D4A8027F6042B074B5 9989125D4EEB3BF6AF84E6B54F058C579F6AE9118655D89D42 2BFB1F761C5794BB1B239050CF54B
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NPL_CHAE.pdf	81F633A797F7034299FEDECF963799FDCD8053104056CE9D81 AA05F0676C52FE4E831FE2957BC76C3C381FA4FA113A43785 29801688344A3D5C9175475F3ACD4

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PTO/SB/30EFS (01-22)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16771068	Filing Date	2020-06-09	Docket Number (if applicable)	21063.0018USWO	Art Unit	2186
First Named Inventor	Gauthier RENARD			Examiner Name	BRIAN THOMAS MISIURA		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 503478

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-11-01
Name	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-22)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20070005809	A1	2007-01-04	Kobayashi et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
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	1	Chae et al., "Wireless Webcam Implementation and Application Utilizing Wireless USB Technology", Journal of the Korea Institute of Information and Communication Engineering, Vol. 18, No. 3 : 569~575 Mar. 2014, with English translation	☒

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	16771068
	Filing Date	2020-06-09
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	Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-11-01
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

52835 7590 11/14/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	
ART UNIT	**PAPER NUMBER**
2186	

DATE MAILED: 11/14/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/14/2024

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

52835 7590 11/14/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/14/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2186	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

IPR2024-01216

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 11/14/2023

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 11/14/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/771,068	Applicant(s) RENARD et al.	
	Examiner BRIAN T MISIURA	Art Unit 2186	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 11/1/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 58-66,68-79 and 81 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 11/1/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Examiner's Statement of Reasons for Allowance

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/1/2023 has been entered.

Allowable Subject Matter

Claims 58-66, 68-79, and 81 are allowed for reasons discussed in previous Notice of Allowances.

The IDS filed 11/1/2023 has been considered and the prior art presented does not change the allowability of the claims, as detailed in the Notice of Allowance dated 8/2/2023.

- Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN T MISIURA whose telephone number is (571)272-0889 - (Direct Fax: 571-273-0889). The examiner can normally be reached on M-F: 8-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Brian T Misiura/
Primary Examiner, Art Unit 2186

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	10/06/2021	BTM
H04L12/12, 0428, 1813	10/06/2021	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, CPC, Inventor, and EAST prior art search	10/06/2021	BTM
Review prosecution/search history of parent application no. 15/858,668	10/06/2021	BTM
IDS Consideration, Update prior art search	03/15/2022	BTM
IDS Consideration	07/25/2022	BTM
IDS Consideration and update previous search	04/07/2023	BTM
Update previous search, IDS consideration, Interference search	07/20/2023	BTM
IDS Consideration and Interference Search	11/06/2023	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
H04L12	18-1895	07/20/2023	BTM
H04M3	56-568	07/20/2023	BTM
H04L65	403-4061	07/20/2023	BTM

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	06 November 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	58	5

U.S. Patent and Trademark Office — Part of Paper No.: 20231106

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner) 06 November 2023 (Date)	O.G. Print Claim(s) 58	O.G. Print Figure 5

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		12		23		34		45		56		67	20	78
	2		13		24		35		46		57	10	68	21	79
	3		14		25		36		47	1	58	11	69		80
	4		15		26		37		48	2	59	12	70	22	81
	5		16		27		38		49	3	60	13	71		
	6		17		28		39		50	4	61	14	72		
	7		18		29		40		51	5	62	15	73		
	8		19		30		41		52	6	63	16	74		
	9		20		31		42		53	7	64	17	75		
	10		21		32		43		54	8	65	18	76		
	11		22		33		44		55	9	66	19	77		

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	06 November 2023 (Date)	O.G. Print Claim(s) 58	O.G. Print Figure 5

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L226	2	"20070005809"	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2023/11/06 04:39 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N125	514	(H04M3/56-568.cpc OR H04L65/403-4061.CPC. OR H04L12/18-1895.cpc.) AND ((translat$3 OR convert$3 OR conversion OR encod$3 OR decod$3) WITH data WITH (software OR program OR application)).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:50 PM
N126	88	(H04M3/56-568.cpc OR H04L65/403-4061.CPC. OR H04L12/18-1895.cpc.) AND ((translat$3 OR convert$3 OR conversion OR encod$3 OR decod$3) WITH data WITH (software)).clm.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:50 PM
N127	242	N125 AND (meeting OR conference)	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/11/06 04:50 PM

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20070005809	A1	2007-01-04	Kobayashi et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USWO

	1	Chae et al., "Wireless Webcam Implementation and Application Utilizing Wireless USB Technology", Journal of the Korea Institute of Information and Communication Engineering, Vol. 18, No. 3 : 569~575 Mar. 2014, with English translation	☒

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Examiner Signature	/BRIAN T MISIURA/	Date Considered	11/06/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(**Not for submission under 37 CFR 1.99)**

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-11-01
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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This is a courtesy reminder that new correspondence is available for the application. If you have not done so already, please review the correspondence listed below. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Application	Document	Mailroom Date	Attorney Docket No.
16771068	NOA	11/14/2023	21063.0018USWO
17595151	CTNF	11/14/2023	20728.0032USWO
17595151	892	11/14/2023	20728.0032USWO
16771068	1449	11/14/2023	21063.0018USWO

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Sincerely,

The Patent Center Team

Doc Code: PTA.IDS
Document Description: Patent Term Adjustment Stmt Under 37 CFR 1.704(d)

PTO/SB/133 (10-21)

PATENT TERM ADJUSTMENT STATEMENT UNDER 37 CFR 1.704(d)		
	Application Number	16/771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Practitioner Docket No.	21063.0018USWO

APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):

☑ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

AND/OR

☐ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

INSTRUCTIONS:

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	December 18, 2023
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9129602	B1	2015-09-08	Shepard et al.	cited in EESR

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040236547	A1	2004-11-25	Rappaport et al.	cited in EESR
	2	20150364274	A1	2015-12-17	Khattak	cited in EESR

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	The extended European search report issued in European Application No. 23192763.3, dated November 30, 2023	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

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☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-12-18
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**12/18/2023 01:39:15 PM Z ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	63651033	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
EESR.pdf	8	Other reference-Patent/Application/Search Documents	260 KB
SB133_0018USWO.pdf	2	Patent Term Adjustment Statement under 37 CFR 1.704(d) filed with an IDS	231 KB
SB08_0018USWO.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
EESR.pdf	7B7E137679FA54B62AE06B9237A7D60718AE0EDADDF816327 1010F9483FD12794299A695DB9C2CC46B30FB585B21CF23A40 368D7ABC9B1A559BCEEE0D6654BDB
SB133_0018USWO.pdf	A3C19D1C5F4982706288A4ADFB3F04E8D35CF8DAD053A366F 403CA5E37661BA8FAEACFA977FB50A38B3DCC91A20DEA93A 613A2CBA1AD919938CAA79BBB641DEA
SB08_0018USWO.pdf	ED95422EE59B1982623A0253F3B4666C58097FB467F48F510B A5B5BD4E2FD8CD84743122BF2103C3EE50A39183444CFE969 6EE809C52CFEF1DB371CCB4B3F8F1

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	12/18/2023 01:39:15 PM Z ET	21063.0018USWO

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	63651033	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	06/09/2020
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	E2023BHD43379634	Yanling Cottle

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	$260.00

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Receipt will establish the filing date of the application

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 01/04/2024

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
01/04/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 16/771,068	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 12/18/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 58-66,68-79 and 81 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 12/18/2023.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	29 December 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	58	5

U.S. Patent and Trademark Office — Part of Paper No.: 20231229

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)		**Total Claims Allowed:** 22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	29 December 2023 (Date)	O.G. Print Claim(s) 58	O.G. Print Figure 5

U.S. Patent and Trademark Office Part of Paper No.: 20231229

11 of 216

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		12		23		34		45		56		67	20	78
	2		13		24		35		46		57	10	68	21	79
	3		14		25		36		47	1	58	11	69		80
	4		15		26		37		48	2	59	12	70	22	81
	5		16		27		38		49	3	60	13	71		
	6		17		28		39		50	4	61	14	72		
	7		18		29		40		51	5	62	15	73		
	8		19		30		41		52	6	63	16	74		
	9		20		31		42		53	7	64	17	75		
	10		21		32		43		54	8	65	18	76		
	11		22		33		44		55	9	66	19	77		

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	29 December 2023 (Date)	O.G. Print Claim(s) 58	O.G. Print Figure 5

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	10/06/2021	BTM
H04L12/12, 0428, 1813	10/06/2021	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, CPC, Inventor, and EAST prior art search	10/06/2021	BTM
Review prosecution/search history of parent application no. 15/858,668	10/06/2021	BTM
IDS Consideration, Update prior art search	03/15/2022	BTM
IDS Consideration	07/25/2022	BTM
IDS Consideration and update previous search	04/07/2023	BTM
Update previous search, IDS consideration, Interference search	07/20/2023	BTM
IDS Consideration and Interference Search	11/06/2023	BTM
IDS Consideration	12/29/2023	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	07/20/2023	BTM
H04M3	56-568	07/20/2023	BTM
H04L65	403-4061	07/20/2023	BTM

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9129602	B1	2015-09-08	Shepard et al.	cited in EESR

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040236547	A1	2004-11-25	Rappaport et al.	cited in EESR
	2	20150364274	A1	2015-12-17	Khattak	cited in EESR

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS Remove

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

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Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	The extended European search report issued in European Application No. 23192763.3, dated November 30, 2023	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/BRIAN T MISIURA/	Date Considered	12/29/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

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First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

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☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2023-12-18
Name/Print	Thomas Lee	Registration Number	66396

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.T.M/

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

52835 7590 08/02/2023
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Yanling Cottle	(Typed or printed name)
/yanling cottle/	(Signature)
February 13, 2024	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

TITLE OF INVENTION: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	11/02/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
MISIURA, BRIAN THOMAS	2186	710-011000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 HSML P.C.
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: **BARCO N.V.**

(B) RESIDENCE: (CITY and STATE OR COUNTRY): **KORTRIJK, BELGIUM,**

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. **503478**

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Thomas Lee/ Date February 13, 2024

Typed or printed name Thomas Lee Registration No. 66396

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**02/13/2024 12:18:10 PM Z ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	64303362	AUTHORIZED BY	Thomas Lee
CUSTOMER #	52835	FILING DATE	06/09/2020
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E20242CC19498401**	**Yanling Cottle**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	**$1,200.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**02/13/2024 12:18:10 PM Z ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	-
CONFIRMATION #	1088	FILED BY	Yanling Cottle
PATENT CENTER #	64303362	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Thomas Lee

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IF_0018_.pdf	1	Issue Fee Payment (PTO-85B)	957 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
IF_0018_.pdf	F50006530F07B1B892C4A0D0D8F71AF77E9909D61DF2AA26F 8A1BF4DE744DD574C293CC223AD2304AD5D587C60D4FDA3 EAB79CABACBF3E15A255803432B4F844

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	03/19/2024	11934328	21063.0018USWO	1088

52835 7590 02/28/2024

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
45 South Seventh Street
Suite 2700
Minneapolis, MN 55402-1683

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Gauthier RENARD, Kuurne, BELGIUM;
Johan Peter Frans DEGRAEF, Gent, BELGIUM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

BARCO N.V., Kortrijk, BELGIUM;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Doc Code: PTA.IDS
Document Description: Patent Term Adjustment Stmt Under 37 CFR 1.704(d)

PTO/SB/133 (10-21)

PATENT TERM ADJUSTMENT STATEMENT UNDER 37 CFR 1.704(d)		
	Application Number	16/771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Practitioner Docket No.	21063.0018USWO

APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):

☑ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

AND/OR

☐ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

INSTRUCTIONS:

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	March 14, 2024
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.*

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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P.O. Box 1450
Alexandria, VA 22313 - 1450
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PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)(2) with Assigned Patent Number)

APPLICATION #	ATTORNEY DOCKET #	FILING DATE
16771068	21063.0018USWO	06/09/2020

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

CONFIRMATION #	**1088**	FILING DATE	**06/09/2020**
ART UNIT	**2186**	FIRST NAMED INVENTOR	**Gauthier RENARD**
EXAMINER	**BRIAN MISIURA**		

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

(1) Petition fee; and
(2) One of the following reasons: A grantable petition requires the following items: (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Reason for withdrawal

Consideration of a request for continued examination (Quick Path Information Disclosure Statement) - RCE request, submission, and fee are attached

Applicant claims the following entity status

Regular Undiscounted

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:
An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature	Name	Registration #
/Thomas Lee/	Thomas Lee	66396

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**03/14/2024 04:17:21 PM Z ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	11934328
CONFIRMATION #	1088	FILED BY	Thomas Lee
PATENT CENTER #	64689515	FILING DATE	06/09/2020
CUSTOMER #	52835	FIRST NAMED INVENTOR	Gauthier RENARD
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	2	ePetition Request Form	29 KB
NPL_EPOA5.pdf	3	Non Patent Literature	72 KB
QPIDS_0018USWO.pdf	2	Quick Path Information Disclosure Statement	193 KB
SB133_0018USWO.pdf	2	Patent Term Adjustment Statement under 37 CFR 1.704(d) filed with an IDS	231 KB
SB08_0018USWO.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	1234 KB
RCE_0018USWO.pdf	3	Request for Continued	1628 KB

Examination (RCE)

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	37254BF33566D6AC9D32F1BFF53458E7A92465B83E800923F6 5310311CB92CF23B7C507A803EDB23CEEA4DF3087D867B99 49B275153B43A31FCFF3A66B2864B9
NPL_EPOA5.pdf	E06094FC09D6663F83C9AA026090E963F26830AB3E6C2EA9B 7EFCF1A9ED7647EF15911976E9EC6E1E077615033CEF17443 4F3EE6DC6781FD7C05ED1AE53AC668
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/771,068	**03/14/2024 04:17:21 PM Z ET**	**21063.0018USWO**

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	11934328
CONFIRMATION #	1088	FILED BY	Thomas Lee
PATENT CENTER #	64689515	AUTHORIZED BY	-
CUSTOMER #	52835	FILING DATE	06/09/2020
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Gauthier RENARD

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1021	**E20243DG17419887**	**Thomas Lee**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1464	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(H) (GROUP III)	140.00	1	140.00
1820	REQUEST FOR CONTINUED EXAMINATION (RCE)- 2ND AND SUBSEQUENT REQUEST (SEE 37 CFR 1.114)	2000.00	1	2000.00
			TOTAL AMOUNT:	**$2,140.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

GRANT LETTER

APPLICATION #	DECISION DATE	DECISION ON PETITION #	ATTORNEY DOCKET NUMBER
16/771,068	03/14/2024		21063.0018USWO

Title of Invention

METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS OF MEETINGS

In re Application of Gauthier RENARD

This is an electronic decision on the petition under , filed March 14, 2024 to withdraw the above-identified application from issue after payment of the issue fee.

The request is **GRANTED.**

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

The application is being referred to Technology Center AU for

Telephone inquired concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions

Doc Code: QPIDS.REQ
Document Description: Quick Path Information Disclosure Statement

PTO/SB/09 (11-23)

CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PROGRAM

Non-Provisional Application Number: 16/771,068	Filing Date: 2020-06-09
First Named Inventor: Gauthier RENARD	Title of Invention: METHOD AND SYSTEM FOR MAKING FUNCTIONAL DEVICES AVAILABLE TO PARTICIPANTS O

THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION.

1. Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
2. Check the box next to the appropriate selection:

   ☑ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1).

   OR

   ☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

   OR

   ☐ See attached certification statement in compliance with 37 CFR 1.97(e).
3. Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 503478.
4. A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**.
   WARNING: Do not submit the petition as a follow-on paper via the USPTO patent electronic filing system. Submit the petition as a Web-based ePetition by signing on to the USPTO patent electronic filing system as a registered user, selecting "Petitions" in the top menu or by using the display cards, and then selecting the appropriate Petition to Withdraw from Issue after Payment of the Issue Fee (for automatic processing and immediate grant, if all petitions requirements are met). Failure to use a Web-based ePetition will result in automatic entry of the RCE.
5. A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
6. The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
7. This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature /Thomas Lee/	Date March 14, 2024
Name (Print/Typed) THOMAS LEE	Practitioner Registration Number (If applicable) 66396

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.**

☐ *Total of _____ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;

2) a federal, state, local, or international agency, in response to its request;

3) a contractor of the USPTO having need for the information in order to perform a contract;

4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;

5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;

6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;

7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;

8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));

9) the Office of Personnel Management (OPM) for personnel research purposes; and

10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
	Filing Date	2020-06-09
	First Named Inventor	Gauthier RENARD
	Art Unit	2186
	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USWO

	1	The communication pursuant to Art. 94(3) in European Application No. 23192763.3, dated March 5, 2024.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2024-03-14
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :Terrance Lawrence

Sale Accounting Date:03/15/2024

Sale Item Reference Number	Effective Date
16771068	03/14/2024

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20243EC25545272	1806	SUBMISSION- INFORMATION DISCLOSURE STMT	$260.00	Deposit Account

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 03/22/2024

HSML P.C.
45 South Seventh Street
Suite 2700
MINNEAPOLIS, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
03/22/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

Corrected ***Notice of Allowability***	**Application No.** 16/771,068	**Applicant(s)** RENARD et al.	
	Examiner BRIAN T MISIURA	**Art Unit** 2186	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 3/14/2024.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 58-66,68-79 and 81 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 3/14/2024.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BRIAN T MISIURA/
Primary Examiner, Art Unit 2186

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

CPC - Searched*		
Symbol	Date	Examiner
G06F13/122, 387, 4282	10/06/2021	BTM
H04L12/12, 0428, 1813	10/06/2021	BTM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
IDS Consideration, CPC, Inventor, and EAST prior art search	10/06/2021	BTM
Review prosecution/search history of parent application no. 15/858,668	10/06/2021	BTM
IDS Consideration, Update prior art search	03/15/2022	BTM
IDS Consideration	07/25/2022	BTM
IDS Consideration and update previous search	04/07/2023	BTM
Update previous search, IDS consideration, Interference search	07/20/2023	BTM
IDS Consideration and Interference Search	11/06/2023	BTM
IDS Consideration	12/29/2023	BTM
IDS Consideration	03/18/2024	BTM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	Art Unit
	BRIAN T MISIURA	2186

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04L12	18-1895	07/20/2023	BTM
H04M3	56-568	07/20/2023	BTM
H04L65	403-4061	07/20/2023	BTM

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	387	F	2013-01-01
H04L	/	12	/	12	I	2013-01-01
G06F	/	13	/	122	I	2013-01-01
G06F	/	13	/	4282	I	2013-01-01
H04L	/	63	/	0428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	18 March 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	58	5

U.S. Patent and Trademark Office — Part of Paper No.: 20240318

126 of 216

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F13/38	/	13	/	38
H04L12/12	/	12	/	12
G06F13/12	/	13	/	12
G06F13/42	/	13	/	42
H04L9/40	/	9	/	40

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186	18 March 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	58	5

U.S. Patent and Trademark Office — Part of Paper No.: 20240318

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/771,068	RENARD et al.
	Examiner	**Art Unit**
	BRIAN T MISIURA	2186

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		12		23		34		45		56		67	20	78
	2		13		24		35		46		57	10	68	21	79
	3		14		25		36		47	1	58	11	69		80
	4		15		26		37		48	2	59	12	70	22	81
	5		16		27		38		49	3	60	13	71		
	6		17		28		39		50	4	61	14	72		
	7		18		29		40		51	5	62	15	73		
	8		19		30		41		52	6	63	16	74		
	9		20		31		42		53	7	64	17	75		
	10		21		32		43		54	8	65	18	76		
	11		22		33		44		55	9	66	19	77		

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 22	
/BRIAN T MISIURA/ Primary Examiner, Art Unit 2186 (Primary Examiner)	18 March 2024 (Date)	O.G. Print Claim(s) 58	O.G. Print Figure 5

U.S. Patent and Trademark Office Part of Paper No.: 20240318

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16771068
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	Examiner Name	BRIAN THOMAS MISIURA
	Attorney Docket Number	21063.0018USWO

	1	The communication pursuant to Art. 94(3) in European Application No. 23192763.3, dated March 5, 2024.	☐

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Examiner Signature	/BRIAN T MISIURA/	Date Considered	03/18/2024

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16771068
Filing Date	2020-06-09
First Named Inventor	Gauthier RENARD
Art Unit	2186
Examiner Name	BRIAN THOMAS MISIURA
Attorney Docket Number	21063.0018USWO

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2024-03-14
Name/Print	Thomas Lee	Registration Number	66396

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Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method	Account Number
I202443D11568807	1820	RCE- 2ND AND SUBSEQUENT REQUEST	$2,000.00	American Express	**********1021

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04/03/2024	04/03/2024	16771068

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I202443D11568807	1820	RCE- 2ND AND SUBSEQUENT REQUEST	$2,000.00	American Express

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	04/23/2024	11966346	21063.0018USWO	1088

52835 7590 04/03/2024

HSML P.C.
45 South Seventh Street
Suite 2700
MINNEAPOLIS, MN 55402-1683

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

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Johan Peter Frans DEGRAEF, Gent, BELGIUM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

BARCO N.V., Kortrijk, BELGIUM;

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/771,068	06/09/2020	Gauthier RENARD	21063.0018USWO	1088

52835 7590 04/23/2024

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MINNEAPOLIS, MN 55402-1683

EXAMINER	
MISIURA, BRIAN THOMAS	

ART UNIT	PAPER NUMBER
2186	

NOTIFICATION DATE	DELIVERY MODE
04/23/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
16/771,068	23-Apr-2024	11966346

HSML P.C.
45 South Seventh Street
MINNEAPOLIS, MN 55402-1683

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