

EXHIBIT 2



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/057,566	08/07/2018	Eric Sommerlade	409001	5211
145234	7590	08/15/2019	EXAMINER	
RealD Spark, LLC			PRINGLE-PARKER, JASON A	
9777 Wilshire Blvd.				
Suite 400				
Beverly Hills, CA 90212				
			ART UNIT	PAPER NUMBER
			2618	
			NOTIFICATION DATE	DELIVERY MODE
			08/15/2019	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):

docket@ntellectlaw.com
eofficeaction@appcoll.com
patpros@reald.com

Notice of Pre-AIA or AIA Status

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

DETAILED ACTION

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1, 18, 25, 27, 33 (and dependent claims), drawn to input patches, adjusted output patches, generating first reference data, generating second reference data, classified in G06T19/20.
 - II. Claims 19, 20, 35 (and dependent claims), drawn to identifying target patch, deriving feature vector, using the feature vector, editing the target patch classified in G06T19/20.

The inventions are independent or distinct, each from the other because:

3. Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because as shown by claims 1, 19, and 20, the feature vectors may be used on their own, or in combination.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present

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application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

4. Restriction for examination purposes as indicated is proper because all the inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

- the inventions require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search strategies or search queries).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

5. Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON PRINGLE-PARKER whose telephone number is (571)272-5690 and e-mail is jason.pringle-parker@uspto.gov. The examiner can normally be reached on 8:30am-5:00pm est Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barry Drennan can be reached on (571) 270-7262. 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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JASON A PRINGLE-PARKER/

Examiner, Art Unit 2618

To: eofficeaction@appcoll.com,patpros@reald.com,docket@ntellectlaw.com
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 145234

Aug 15, 2019 03:32:30 AM

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RealD Spark, LLC
9777 Wilshire Blvd.
Suite 400
Beverly Hills, CA 90212
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 145234 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
16057566	CTRS	08/15/2019	409001

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): RealD Spark, LLC	§	Art Unit:	2618
	§		
Serial No.: 16/057,566	§	Examiner:	Pringle-Parker, Jason A
	§		
Filed: August 7, 2018	§	Atty. Docket No.:	409001
	§		
	§	Confirmation No.:	5211

Submitted via EFS

Mail Stop Amendment
Commissioner for Patents
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Alexandria, VA 22313-1450

**CERTIFICATE OF FILING ELECTRONICALLY VIA EFS
37 CFR 1.8**

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/Penny L Lowry/
Penny L. Lowry, Reg. No. 57186
DATE OF SUBMISSION: OCTOBER 15, 2019
ELECTRONIC FILING (EFS)

RESPONSE TO ELECTION/RESTRICTION REQUIREMENT

This communication is in response to the Restriction Requirement set forth in the office action mailed August 15, 2019 ("Office Action"). Applicant notes that because the two-month deadline for filing a response expires on October 15, 2019, this response is timely filed.

Listing of Claims begins on page **2** of this filing; and
Remarks begin on page **11** of this filing.

Electronic Acknowledgement Receipt

EFS ID:	37461444
Application Number:	16057566
International Application Number:	
Confirmation Number:	5211
Title of Invention:	Adjusting a digital representation of a head region
First Named Inventor/Applicant Name:	Eric Sommerlade
Customer Number:	145234
Filer:	Penny Lea Lowry/Stefan Bump
Filer Authorized By:	Penny Lea Lowry
Attorney Docket Number:	409001
Receipt Date:	15-OCT-2019
Filing Date:	07-AUG-2018
Time Stamp:	15:47:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		409001_Restriction_Response.pdf	119245 fe1ed9fc721ed3df510c352d0f54dc84746c1f19	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Applicant Arguments/Remarks Made in an Amendment	11	11
	Claims	2	10
	Preliminary Amendment	1	1
Warnings:			
Information:			
Total Files Size (in bytes):		119245	
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. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.			

REMARKS

Claims 1-36 were originally filed in this application. Claims 4-6, 9-16, 18-19, 22, 30-31, and 36 were previously amended to remove multiple dependencies and to correct minor typographical errors. Claims 19-24 and 35-36 are currently withdrawn.

Restriction Requirement

The Office Action sets forth a restriction requirement. Without agreeing with this restriction requirement and to advance prosecution, Applicant elects, without traverse, Examiner's designated Group I (claims 1-18 and 25-34). Accordingly, Applicant withdraws from examination claims 19-24 and 35-36.

Conclusion

If the Examiner has any questions regarding this response or the application in general, the Examiner is invited to contact Applicant's attorney at the below-listed telephone number. Applicant does not believe that any fees are due with the filing of this document; however, if it is determined that any additional fees are due, or if an overcharge had occurred, please charge or credit deposit account no. 50-6262, referencing Attorney Docket No. 409001.

Respectfully submitted,

Date: October 15, 2019

/Penny L Lowry/
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LISTING OF CLAIMS

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

1. (Original) A method of generating reference data for adjusting a digital representation of a head region, the method comprising:
 - receiving training data comprising:
 - a set of input patches, each input patch comprising a target feature of a digital representation of a head region prior to adjustment of the digital representation of the head region, wherein the target feature is the same for each input patch; and
 - a set of output patches in one-to-one correspondence with the input patches, each output patch comprising the target feature of the digital representation of the head region after adjustment of the digital representation of the head region;
 - using a first machine learning algorithm to generate first reference data using the training data, the first reference data comprising editing instructions for adjusting the digital representation of the head region for a range of possible digital representations of the head region; and
 - using a second machine learning algorithm to generate second reference data using the same training data as the first machine learning algorithm and the first reference data generated by the first machine learning algorithm, the second reference data comprising editing instructions for adjusting the digital representation of the head region for a range of possible digital representations of the head region.
2. (Original) The method of claim 1, wherein:
 - the first reference data comprise first editing instructions for a range of possible configurations of the target feature and first selection instructions for selecting editing instructions for a particular input patch from the first editing instructions based on the configuration of the target feature of the input patch; and
 - the second reference data comprise second editing instructions for a range of possible configurations of the target feature and second selection instructions for selecting editing

instructions for a particular input patch from the second image editing instructions based on the configuration of the target feature of the input patch.

3. (Original) The method of claim 2, wherein the configuration of the target feature of each input patch is represented by a feature vector derived from plural local descriptors of the input patch, and the first and second selection instructions define how the feature vector is used to select editing instructions for the input patch.

4. (Previously presented) The method of claim 2, wherein the editing instructions comprise a displacement vector field defining how the input patch is to be transformed.

5. (Previously presented) The method of claim 2, wherein the editing instructions comprise a filter field, a brightness adjustment field, or a texture blending field.

6. (Previously presented) The method of claim 2, wherein:
a first editing algorithm is used by the first machine learning algorithm to define how the first editing instructions are to be applied to an input patch to derive an output patch; and
a second editing algorithm is used by the second machine learning algorithm to define how the second editing instructions are to be applied to an input patch to derive an output patch.

7. (Original) The method of claim 6, wherein:
the second editing instructions are principle component analysis components of a principle component analysis of the first editing instructions; and
the second image editing algorithm is configured to transform the second editing instructions into the first editing instructions by inverse principle component analysis transform.

8. (Original) The method of claim 6, wherein:
the second editing instructions are wavelet components of the first editing instructions;
and
the second editing algorithm is configured to transform the second editing instructions into the first editing instructions by inverse wavelet transform.

9. (Previously presented) The method of claim 2, wherein the first selection instructions for the first reference data are able to select between a larger number of alternative editing instructions than the second selection instructions for the second reference data.
10. (Previously presented) The method of claim 1, wherein the first machine learning algorithm is of a different machine learning algorithm type than the second machine learning algorithm.
11. (Previously presented) The method of claim 1, wherein the first machine learning algorithm comprises one or more of the following: a neural network; a support vector machine; and a generative adversarial network (GAN).
12. (Previously presented) The method of claim 1, wherein the second machine learning algorithm comprises one or more of the following: a regression forest; regression ferns, cluster centres, a lookup table, and separable filter banks.
13. (Previously presented) The method of claim 1, wherein the first machine learning algorithm comprises a first neural network and the second machine learning algorithm comprises a second neural network, wherein the second neural network comprises fewer layers and/or smaller convolution fields than the first neural network.
14. (Previously presented) The method of claim 1, wherein the target feature comprises one or more of the following: an eye region comprising at least part of an eye, a nose region comprising at least part of a nose, a mouth region comprising at least part of a mouth, a chin region comprising at least part of a chin, a neck region comprising at least part of a neck, and a hair region comprising hair.
15. (Previously presented) The method of claim 1, wherein:
the target feature comprises an eye region comprising at least part of an eye and the adjustment of the digital representation of the head region comprises adjusting a gaze direction;

the target feature comprises a nose region comprising at least part of a nose and the adjustment of the digital representation of the head region comprises adjusting a shape and/or texture of the nose;

the target feature comprises a chin region comprising at least part of a chin and the adjustment of the digital representation of the head region comprises adjusting a shape and/or texture of the chin;

the target feature comprises a neck region comprising at least part of a neck and the adjustment of the digital representation of the head region comprises adjusting a shape and/or texture of the neck; and/or

the target feature comprises a hair region comprising hair and the adjustment of the digital representation of the head region comprises adjusting a color of the hair.

16. (Previously presented) The method of claim 1, wherein the second editing instructions in the second reference data are provided in a compressed representation.

17. (Original) The method of claim 16, wherein the compressed representation comprises one or more of the following: a principle component analysis representation; a wavelet representation; Fourier and/or discrete cosine transform components; cluster centers.

18. (Previously presented) A method of adjusting a digital representation of a head region, the method comprising
receiving a digital representation of a head region; and
using reference data comprising editing instructions to adjust the digital representation of the head region, wherein the reference data comprises the second reference data generated by the method of claim 1.

19. (Withdrawn) A method of adjusting a digital representation of a head region, the method comprising:
identifying a target patch in the digital representation of the head region, the target patch comprising a target feature of the digital representation of the head region;
deriving a feature vector from plural local descriptors of the target patch;

using the feature vector to select editing instructions from reference data, the reference data comprising editing instructions for a range of possible values of the feature vector; and
applying the selected editing instructions to the target patch to adjust the digital representation of the head region, wherein:

the reference data comprises the second reference data generated by the method of claim 1.

20. (Withdrawn) A method of adjusting a digital representation of a head region, the method comprising:

identifying a target patch in the digital representation of the head region, the target patch comprising a target feature of the digital representation of the head region;

deriving a feature vector from plural local descriptors of the target patch;

using the feature vector to select editing instructions from reference data, the reference data comprising editing instructions for a range of possible values of the feature vector; and

applying the selected editing instructions to the target patch to adjust the digital representation of the head region, wherein:

the editing instructions in the reference data are provided in a compressed representation.

21. (Withdrawn) The method of claim 20, wherein the compressed representation comprises one or more of the following: a principle component analysis representation; a wavelet representation; Fourier and/or discrete cosine transform components; cluster centres.

22. (Withdrawn) The method of claim 18, wherein a plurality of the digital representations of the head region are received and adjusted, each digital representation being captured from the head region at a different point in time, and the method further comprises updating the second machine learning algorithm using editing instructions generated by the first machine learning algorithm using one or more of the received and adjusted digital representations.

23. (Withdrawn) The method of claim 22, wherein the updating of the second machine learning algorithm is performed at or near input data frame rate.

24. (Withdrawn) The method of claim 23, wherein only a subset of the received and adjusted digital representations are used to update the second machine learning algorithm.

25. (Original) A method of training a machine learning algorithm to adjust a digital representation of a head region, comprising:

receiving training data comprising:

a set of input patches, each input patch comprising a target feature of a digital representation of a head region prior to adjustment of the digital representation of the head region, wherein the target feature is the same for each input patch; and

first reference data generated by a pre-trained first machine learning algorithm, the first reference data comprising a set of editing instructions in one-to-one correspondence with the input patches, each editing instruction being for adjusting the digital representation of the head region;

updating a pre-trained second machine learning algorithm trained to generate second reference data, where the input for the updating comprises the training data and the generated first reference data, the second reference data comprising editing instructions for adjusting the digital representation of the head region.

26. (Original) The method of claim 25, wherein the updating of the second machine learning algorithm is performed at or near input data frame rate.

27. (Original) A method of training a machine learning algorithm to adjust a digital representation of a head region, the method comprising:

receiving training data comprising a set of input digital representations of a head region;

training a first machine learning algorithm using the training data to perform an adjustment of a digital representation of a head region;

using the trained first machine learning algorithm to generate first reference data, the first reference data comprising an adjusted digital representation of the head region for each of at least a subset of the input digital representations, each adjusted digital representation being obtained by performed the adjustment that the first machine learning algorithm was trained to perform; and

training a second machine learning algorithm using at least a subset of the training data used to train the first machine learning algorithm and the first reference data to perform the same adjustment of a digital representation of a head region as the first machine learning algorithm.

28. (Original) The method of claim 27, wherein the adjustment of the digital representation comprises converting from a two-dimensional digital representation to a three-dimensional digital representation.

29. (Original) The method of claim 28, wherein the training of the first machine learning algorithm comprises iteratively using a rendering process to generate a two-dimensional digital representation from a three-dimensional digital representation generated by the first machine learning algorithm and comparing the generated digital representation with a corresponding digital representation in the training data.

30. (Previously presented) The method of claim 25, further comprising receiving a further digital representation of the head region and using the updated or trained second machine learning algorithm to adjust the further digital representation.

31. (Previously presented) A computer program capable of execution by a processor and arranged on execution to cause the processor to perform a method according to claim 1.

32. (Original) A computer readable storage medium storing a computer program according to claim 31.

33. (Original) A device for generating reference data for adjusting a digital representation of a head region, the device comprising a data processing unit arranged to:

receive training data comprising:

a set of input patches, each input patch comprising information about a target feature of a digital representation of the head region prior to adjustment of the digital representation of the head region, wherein the target feature is the same for each input patch; and

a set of output patches in one-to-one correspondence with the input patches, each output patch comprising the target portion of the digital representation of the head region after adjustment of the digital representation of the head region;
use a first machine learning algorithm to generate first reference data using the training data; and
use a second machine learning algorithm to generate second reference data using the same training data as the first machine learning algorithm and the first reference data output by the first machine learning algorithm.

34. (Original) The device of claim 33, wherein:

the first reference data comprises editing instructions for adjusting the digital representation of the head region for a range of possible digital representations of the head region;

the second reference data comprises editing instructions for adjusting the digital representation of the head region for a range of possible digital representations of the head region;

the second editing instructions in the second reference data are provided in a compressed representation.

35. (Withdrawn) A device for adjusting a digital representation of a head region, the device comprising a data processing unit arranged to process the digital representation of the head region by:

identifying a target patch in the digital representation of the head region, the target patch comprising information about a target feature of the digital representation of the head region;

deriving a feature vector from plural local descriptors of the target patch;

using the feature vector to select editing instructions from reference data, the reference data comprising editing instructions for a range of possible values of the feature vector; and

applying the selected editing instructions to the target patch to adjust the digital representation of the head region, wherein:

the editing instructions in the reference data are provided in a compressed representation.

36. (Withdrawn) The device of claim 35, further comprising a telecommunications interface arranged to transmit the adjusted digital representation over a telecommunications network to a destination device to allow display of the head region thereon.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/057,566		Filing Date 08/07/2018		☐ 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), (l), 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 \$50 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *		x \$230 =					
☐ 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									
AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	10/15/2019								
	Total (37 CFR 1.16(j))	* 36	Minus	** 36	= 0	x \$50 =		0	
	Independent (37 CFR 1.16(h))	* 6	Minus	*** 6	= 0	x \$230 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(j))	*	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.						SLIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/LISA E FULTON/			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".									
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