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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/225,357	04/08/2021	James M. Canter	HART:032C4	1030

36275 7590 12/21/2022

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EXAMINER	
GUDORF, LAURA A	

ART UNIT	PAPER NUMBER
2876	

NOTIFICATION DATE	DELIVERY MODE
12/21/2022	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):

epehadmin@ipaustin.com
mjones@ipaustin.com
uspto@dockettrak.com

Notice of Abandonment	Application No.	Applicant(s)
	17/225,357	Canter et al.
	Examiner	Art Unit
	LAURA A GUDORF	2876

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

This application is abandoned in view of:

1. ☑ Applicant's failure to timely file a proper reply to the Office letter mailed on 26 May 2022.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of:(1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a *bona fide* attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 8 below).
   (d) ☑ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $ _____ is insufficient. A balance of $ _____ is due.
   The issue fee required by 37CFR 1.18 is $ _____ . The publication fee, if required by 37 CFR 1.18(d), is $ _____ .
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33 (b). See 37 CFR 1.138(b).

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.

6. ☐ The decision by the Patent Trial and Appeal Board rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☐ The dismissal of the appeal in an application having no allowed claims. (When an appeal is dismissed in an application having no allowed claims the application stands abandoned. See MPEP 1215.04 subsections I-V for an explanation of the reasons why an appeal is dismissed.)

8. ☑ The reason(s) below:

The examiner called but was unable to establish communication to confirm no response was filed.

/LAURA A GUDORF/ Primary Examiner, Art Unit 2876	

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

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17/225,357	04/08/2021	James M. Canter	HART:032C4	1030

36275 7590 05/26/2022

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EXAMINER	
GUDORF, LAURA A	

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

epehadmin@ipaustin.com
mjones@ipaustin.com

Office Action Summary	Application No. 17/225,357	Applicant(s) Canter et al.	
	Examiner LAURA A GUDORF	Art Unit 2876	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 09/24/2021.

☐ 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) 1-67 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) 1-67 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 _____ 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 04/08/2021; 09/02/2021.

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

4) ☐ Other: _____.

DETAILED ACTION

Summary

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

This is a first Office Action on the merits.

Claims 1-67 are currently pending.

Claim Objections

Claim 52 is objected to because of the following informalities:

In claim 52, line 1, please amend "the printer vote record" to recite "the printed vote record";

Appropriate correction is required.

Claim Rejections - 35 USC § 103

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.

Claim 1, 2, 6-10, 13, 14, 16, and 54 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of HEILPER, US 7,406,201.

Re claims 1-2 and 54:

BROCKHOUSE teaches a method for electronic voting using printed vote records, comprising:

Generating a printed vote record of at least one vote selection of a voter [0039] [0106] [Figure 6];

Providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection [0039] [0106] [Figure 6];

Electronically capturing information from the printed vote record [0134];

Using optical character recognition (OCR) on at least a portion of the electronically captured information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's tat least one vote selection [0134];

Generating a cast vote record, which is to be a stored record of all of the voter's final vote selections and to be the voter's casted vote used for vote tabulation, the cast vote record indicating the voter's at least one vote selection [0108] [0134];

Wherein the cast vote record provides the voter's sole casted vote used for vote tabulation [0108].

BROCKHOUSE does not teach comparing the first data set to a second data set; wherein, prior to generating any cast vote record, an accuracy of data to be cast is confirmed based at least in part on a comparison of the first data set and the second data set; wherein the second data set comprises an electronic dictionary.

HEILPER teaches generating a data set from human readable text using OCR and compares the data set to a dictionary for OCR error correction (column 3, lines 15-

35; column 5, lines 10-22; Figure 2); wherein the comparing the first data set to a dictionary is utilized to confirm an accuracy of an OCR process (column 3, lines 15-35; column 5, lines 10-22; Figure 2).

It would have been obvious to one of ordinary skill in the art before the effective filing date to further information the teachings of HEILPER in the method of BROCKHOUSE such that the first data set is compared to a dictionary for the purpose of identifying and correcting OCR errors (column 5, lines 10-22).

Re claims 6-10:

BROCKHOUSE, in view of HEILPER, teaches the method of claim 1, wherein the electronically capturing information from the printed vote record comprises electronically scanning the voter readable text [0134];

Wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection [0053] [Figure 6], and wherein the electronically capturing information from the printed vote record further comprises electronically scanning the encoded data [0053] [Figure 6];

Wherein the encoded data is contained in a visual representation of encoded data [0053] [Figure 6];

Wherein the visual representation of encoded data is a barcode; wherein the barcode is a one-dimensional barcode [0053] [Figure 6].

Re claims 13-14:

BROCKHOUSE, in view of HEILPER, teaches the method of claim 1, wherein the information captured from the printed voter record comprises the voter readable text indicating the voter's at least one vote selection and other information [0134];

Wherein the other information is contained in a barcode [0053].

Re claim 16:

BROCKHOUSE, in view of HEILPER, teaches the method of claim 1, wherein electronically capturing information from the printed vote record comprises capturing an image of the printed vote record [0050].

Claims 3-4, 15, and 55-60 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of HEILPER, US 7,406,201, as applied in claims 1 and 13, and further in view of WANG et al, US 2016/0019439

Re claims 3-4 and 15:

BROCKHOUSE, in view of HEILPER, teaches the method of claims 1 and 13, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection; wherein electronically capturing information form the printed vote record includes capturing the encoded data.

BROCKHOUSE does not teach the second data set is generated at least in part from the encoded data.

WANG teaches a system configured to perform an OCR algorithm on an human readable text in an image and perform a data recognition algorithm on a barcode on the image [0066]-[0074]; the system compares the data extracted from the barcode to the data obtained from the OCR process to verify or correct the human readable text data [0024] [0074]-[0075] [0083].

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the aforementioned teachings of WANG in the method of BROCKHOUSE, in view of HEILPER, such that the OCR data is compared to encoded data obtained from barcodes printed on the cast vote record for the purpose of reducing and detecting potential errors.

Re claims 55-60:

BROCKHOUSE, in view of HEILPER, teaches the method of claim 54, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection [0053];

Wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection [0053] [Figure 6], and wherein the electronically capturing information from the printed vote record further comprises electronically scanning the encoded data [0053] [Figure 6];

Wherein the encoded data is contained in a visual representation of encoded data [0053] [Figure 6];

Wherein the visual representation of encoded data is a barcode; wherein the barcode is a one-dimensional barcode [0053] [Figure 6].

BROCKHOUSE does not teach the second data set is generated at least in part from the encoded data.

WANG teaches a system configured to perform an OCR algorithm on an human readable text in an image and perform a data recognition algorithm on a barcode on the image [0066]-[0074]; the system compares the data extracted from the barcode to the

data obtained from the OCR process to verify or correct the human readable text data [0024] [0074]-[0075] [0083].

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the aforementioned teachings of WANG in the method of BROCKHOUSE, in view of HEILPER, such that the OCR data is compared to encoded data obtained from barcodes printed on the cast vote record for the purpose of reducing and detecting potential errors.

Claims 11-12 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of HEILPER, US 7,406,201, as applied in claim 1, and further in view of NADAF, BR 2013018558.

Re claims 11-12:

BROCKHOUSE, in view of HEILPER, teaches the method of claim 9, but does not teach the barcode is a two-dimensional barcode, the two-dimensional barcode being a QR code.

NADAF teaches a printed vote record comprising a QR code encoding data based at least in part on a voter's at least one vote selection [Figure 4].

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the teachings of NADAF in the method of BROCKHOUSE, in view of HEILPER, such that the barcode is a QR code as QR codes are well known in the art to enable larger quantities of data to be encoded within a single code.

Claims 17, 19-20, 23 39, 52-53, 61-62, and 65-66 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of WANG et al, US 2016/0019439

Re claims 17, 23, 61-62, and 65-66:

BROCKHOUSE teaches a method for electronic voting using printed vote records, comprising:

Generating a printed vote record of at least one vote selection of a voter [Figure 6];

Providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection [0039] [0106] [Figure 6];

Electronically capturing first information from the printed vote record [0134];

Using OCR on the first information to generate a first data set, the first data set based at least in part on the voter's readable text indicating the voter's at least one vote selection [0134]; and

Generating a cast vote record indicating the voter's at least one vote selection, the cast vote record being a stored record of all of the voter's final vote selection [0108] [0134]; wherein the cast vote record provides the voter's sole casted vote used for tote tabulation [0108]; wherein the cast vote record is based on the first data set [0134].

BROCKHOUSE does not teach comparing the first data set to a second data set generated from electronically capturing second information from the printed vote record, wherein prior to generating any cast vote record which is to be a stored record of all of the voter's final vote selections, an accuracy of data to be cast is confirm based at least in part on a comparison of the first data set to the second data set.

WANG teaches a system configured to perform an OCR algorithm on an human readable text in an image and perform a data recognition algorithm on a barcode on the image [0066]-[0074]; the system compares the data extracted from the barcode to the data obtained from the OCR process to verify or correct the human readable text data [0024] [0074]-[0075] [0083].

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the aforementioned teachings of WANG in the method of BROCKHOUSE such that the OCR data is compared to encoded data obtained from barcodes printed on the cast vote record for the purpose of reducing and detecting potential errors.

Re claims 19-20:

BROCKHOUSE, in view of WANG, teaches the method of claim 17, wherein the encoded data is contained in a visual representation of encoded data [0053] [Figure 6] the visual representation of encoded data is a barcode [0053] [Figure 6].

Re claim 24:

BROCKHOUSE, in view of WANG, teaches the method of claim 17, wherein the cast vote record is based on the first data set [0108] [0134].

Re claims 26-27:

BROCKHOUSE, in view of WANG, teaches the method of claim 17, wherein the cast vote record is configured to be tabulated with other records to indicate the outcome of an election [0117] [0134]; wherein after the cast vote record is generated, the cast vote record is utilized during a tabulation of an election [0117] [0134].

Re claims 39 and 53:

BROCKHOUSE teaches a method for electronic voting using printed vote records, comprising:

Generating a printed vote record of at least one vote selection of a voter [Figure 6];

Providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection [0039] [0106] [Figure 6];

Electronically capturing first information from the printed vote record [0134];

Using OCR on the first information to generate a first data set, the first data set based at least in part on the voter's readable text indicating the voter's at least one vote selection [0134]; and

Generating a cast vote record indicating the voter's at least one vote selection, the cast vote record being a stored record of all of the voter's final vote selection [0108] [0134];

wherein the cast vote record is configured to be tabulated with other records to indicate the outcome of an election [0117] [0134]; wherein after the cast vote record is generated, the cast vote record is utilized during a tabulation of an election [0117] [0134]; wherein the cast vote record provides the voter's sole casted vote used for vote tabulation [0108].

BROCKHOUSE does not teach comparing the first data set to a second data set generated from electronically capturing second information from the printed vote record, wherein prior to generating any cast vote record which is to be a stored record of all of the voter's final vote selections, an accuracy of data to be cast is confirm based at least in part on a comparison of the first data set to the second data set.

WANG teaches a system configured to perform an OCR algorithm on an human readable text in an image and perform a data recognition algorithm on a barcode on the image [0066]-[0074]; the system compares the data extracted from the barcode to the data obtained from the OCR process to verify or correct the human readable text data [0024] [0074]-[0075] [0083].

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the aforementioned teachings of WANG in the method of BROCKHOUSE such that the OCR data is compared to encoded data obtained from barcodes printed on the cast vote record for the purpose of reducing and detecting potential errors.

Re claim 52:

BROCKHOUSE, in view of WANG, further comprising utilizing the printed vote record for auditing the election, the auditing of the election being separate from the tabulation of the election [0088] [0128].

Claims 18, 25, 40, 42, 44-51, and 67 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of WANG et al, US 2016/0019439, as applied in claim 17, and further in view of HEILPER, US 7,406,201.

Re claims 18, 25, 40, 42, 44-51, and 67:

BROCKHOUSE, in view of WANG, teaches the method of claims 17 and 39, but does not teach further using an election dictionary to assist in confirming the accuracy of the data to be cast; wherein using OCR on the first information to generate a first

data set further comprises recursively modifying an OCR process applied to the voter readable text.

HEILPER teaches generating a data set from human readable text using OCR and compares the data set to a dictionary for OCR error correction (column 3, lines 15-35; column 5, lines 10-22; Figure 2); wherein the comparing the first data set to a dictionary is utilized to confirm an accuracy of an OCR process (column 3, lines 15-35; column 5, lines 10-22; Figure 2); recursively modifying the first data set by: generating an OCR string from the text (column 5, lines 45-67); and calculating a distance between the OCR string and at least one comparison string (column 6, lines 36-48); further recursively modifying the first data set by identifying an alternative comparison string having distance below a defined threshold (column 6, lines 36-48; column 7, lines 1-45); wherein the distance is a Levenshtein distance (column 1, lines 26-41).

It would have been obvious to one of ordinary skill in the art before the effective filing date to further information the teachings of HEILPER in the method of BROCKHOUSE such that the first data set is compared to a dictionary for the purpose of identifying and correcting OCR errors (column 5, lines 10-22). While HEILPER does not discuss the dictionary including at least a part of a candidate's name and additional data, it would have been obvious to one of ordinary skill in the art to error check the election terms.

Claims 21-22, 41, 43, and 63-64 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of WANG et al, US

2016/0019439, as applied in claim 17, and further in view of HERSKOWITZ, US 6,971,574.

Re claims 21-22, 41, 43, and 63-64:

BROCKHOUSE, in view of WANG, teaches the method of claims 17 and 39, but does not teach confirming an accuracy of the OCR by comparing a first hash produced form the first data set to a second hash, wherein the second hash is at least part of the encoded data.

HERSKOWITZ teaches an electronic voting system which assigned confidential hash numbers to ballot choices (column 1, lines 44-48). The hash value is further encrypted to produce an encrypted hash total (EHT). The EHT is stored in memory and is further printed on the voter's receipt. The first hash (recorded hash) and the second hash (printed EHT) are provided on the printed vote r.0ecord and compared to verify the integrity of the printed vote (column 2, lines 12-17).

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the additional hash value procedures to further increase the security of BROCKHOUSE's voting method by providing an additional way to verify the vote (column 2, line 12-17).

Claims 28 and 34-37 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of HEILPER, US 7,406,201.

Re claims 28 and 34-37:

BROCKHOUSE teaches an electronic voting system for using printed vote records, comprising:

A printer configured to generate a printed vote record of at least one vote selection of a voter, the printed vote record including voter readable text indicating the voter's at least one vote selection [0039] [0046] [0106];

A scanned configured to electronically capture first information from the printed vote record, the first information including the voter readable text [0134]; and

A processors configured to use OCR on the first information to generate a first data set based at least in part on the voter readable text indicating the voter's at least one vote selection [0134],

Wherein the processor is further configured to provide a cast vote record which is to be a stored record of all the voter's final vote selection indicating the voter's at least one vote selection based on the first data set [0134].

BROCKHOUSE does not teach the processor is configured to recursively modify the first data set.

HEILPER teaches an OCR method in which a processor recursively modifies first data set by:

HEILPER teaches generating a data set from human readable text using OCR and compares the data set to a dictionary for OCR error correction (column 3, lines 15-35; column 5, lines 10-22; Figure 2); wherein the comparing the first data set to a dictionary is utilized to confirm an accuracy of an OCR process (column 3, lines 15-35; column 5, lines 10-22; Figure 2); recursively modifying the first data set by: generating an OCR string from the text (column 5, lines 45-67); and calculating a distance between

the OCR string and at least one comparison string (column 6, lines 36-48); further recursively modifying the first data set by identifying an alternative comparison string having distance below a defined threshold (column 6, lines 36-48; column 7, lines 1-45); wherein the distance is a Levenshtein distance (column 1, lines 26-41).

It would have been obvious to one of ordinary skill in the art before the effective filing date to further information the teachings of HEILPER in the method of BROCKHOUSE such that the first data set is compared to a dictionary for the purpose of identifying and correcting OCR errors (column 5, lines 10-22).

Claims 29-33 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of HEILPER, US 7,406,201, as applied in claim 38, and further in view of WANG et al, US 2016/0019439 and HERSKOWITZ, US 6,971,574.

Re claim 29-33:

BROCKHOUSE, in view of HEILPER, teaches the system of claim 28, but does not teach the scanner is further configured to electronically capture second information from the printed vote record, to generate a second data set, the second information comprising encode data, and wherein the processor is further configured to generate an OCR hash from the first data set, and to compare the OCR hash to an encoded hash extracted from the encoded data on the printed vote record.

WANG teaches a system configured to perform an OCR algorithm on an human readable text in an image and perform a data recognition algorithm on a barcode on the image [0066]-[0074]; the system compares the data extracted from the barcode to the

data obtained from the OCR process to verify or correct the human readable text data [0024] [0074]-[0075] [0083].

HERSKOWITZ teaches an electronic voting system which assigned confidential hash numbers to ballot choices (column 1, lines 44-48). The hash value is further encrypted to produce an encrypted hash total (EHT). The EHT is stored in memory and is further printed on the voter's receipt. The first hash (recorded hash) and the second hash (printed EHT) are provided on the printed vote record and compared to verify the integrity of the printed vote (column 2, lines 12-17).

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the aforementioned teachings of WANG in the method of BROCKHOUSE, in view of HEILPER, such that the OCR data is compared to encoded data obtained from barcodes printed on the cast vote record for the purpose of reducing and detecting potential errors.

It would have further been obvious to one of ordinary skill in the art before the effective filing date to further incorporate additional hash value procedures to further increase the security of BROCKHOUSE's voting method by providing an additional way to verify the vote (column 2, lines 12-17).

Claims 38 is/are rejected under 35 U.S.C. 103 as being unpatentable over BROCKHOUSE, US 2014/0231513 in view of HEILPER, US 7,406,201, as applied in claim 28, and further in view of WANG et al, US 2016/0019439.

Re claim 38:

BROCKHOUSE, in view of HEILPER, teaches the system of claim 28, but does not teach the scanner is further configured to electronically capture second information from the printed vote record, to generate a second data set, the second information comprising encoded data, and wherein the processor is further configured to confirm, prior to generating the cast vote record, and accuracy of data to be cast based at least in part on a comparison of the first data set and the second data set.

WANG teaches a system configured to perform an OCR algorithm on an human readable text in an image and perform a data recognition algorithm on a barcode on the image [0066]-[0074]; the system compares the data extracted from the barcode to the data obtained from the OCR process to verify or correct the human readable text data [0024] [0074]-[0075] [0083].

It would have been obvious to one of ordinary skill in the art before the effective filing date to further incorporate the aforementioned teachings of WANG in the system of BROCKHOUSE, in view of HEILPER, such that the OCR data is compared to encoded data obtained from barcodes printed on the cast vote record for the purpose of reducing and detecting potential errors.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAURA A GUDORF whose telephone number is (571)270-7607. If the Examiner cannot be reached by telephone, she can be reached through the following e-mail address: laura.gudorf@uspto.gov. The examiner can normally be reached on M-F 6:00-4:00 PM.

If attempts to reach the examiner by telephone and e-mail are unsuccessful, the examiner's supervisor, Michael Lee can be reached on (571)272-2398. 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.

/LAURA A GUDORF/
Primary Examiner, Art Unit 2876

Notice of References Cited	Application/Control No. 17/225,357	Applicant(s)/Patent Under Reexamination Canter et al.	
	Examiner LAURA A GUDORF	Art Unit 2876	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20160019439-A1	01-2016	Wang; Xiaohang	G06K9/62	382/183
	B					
	C					
	D					
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	I					
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	K					
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

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*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/225,357	Canter et al.
	Examiner	Art Unit
	LAURA A GUDORF	2876

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/21/2022								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
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Election Systems & Software, LLC v. Hart Intercivic, Inc.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/225,357	Canter et al.
	Examiner	**Art Unit**
	LAURA A GUDORF	2876

CLAIM		DATE								
Final	Original	05/21/2022								
	43	✓								
	44	✓								
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	46	✓								
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/225,357	Canter et al.
	Examiner	Art Unit
	LAURA A GUDORF	2876

CPC - Searched*		
Symbol	Date	Examiner
G07C13/00; G06V30/40,10; G06K7/10346; G06K17/0032	05/20/2022	LAG

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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Search Notes		
Search Notes	Date	Examiner
Inventor and Applicant name search	05/20/2022	LAG
SEARCH - see attached search history for detailed cpc and text search string strategies used	05/20/2022	LAG

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

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

Bibliographic Data

Application No: 17/225,357

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /LAURA A GUDORF/ (Examiner's Signature) ____ (Initials)

Title: Optical Character Recognition Of Voter Selections For Cast Vote Records

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
04/08/2021	235	2876	HART:032C4
RULE			

APPLICANTS

Hart InterCivic, Inc., Austin, TX,

INVENTORS

James M. Canter, Austin, TX, UNITED STATES

Drew E. Tinney, Austin, TX, UNITED STATES

Ievgen Konovalenko, Austin, TX, UNITED STATES

CONTINUING DATA

This application is a CON of 16919267 07/02/2020 PAT 11004292

16919267 is a CON of 16745621 01/17/2020 PAT 10950078

16745621 is a CON of 16560222 09/04/2019 PAT 10573111

16560222 is a CON of 16239607 01/04/2019 PAT 10445966

16239607 has PRO of 62711212 07/27/2018

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/14/2021

STATE OR COUNTRY

UNITED STATES

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1101 S. Capital of Texas Highway
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Austin, TX 78746
UNITED STATES

FILING FEE RECEIVED

$5,400

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

PTO/SB/08a (03-15)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17225357
Filing Date	2021-04-08
First Named Inventor	JAMES M. CANTER
Art Unit	
Examiner Name	
Attorney Docket Number	HART:032C4

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	Application Number	17225357
	Filing Date	2021-04-08
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

/L.A.G/	1	Written Decision, Election Systems & Software, LLC. v. Hart InterCivic, Inc., PGR2020-00031, Patent No. 10,445,966, 86 pgs.	

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EXAMINER SIGNATURE

Examiner Signature	/LAURA A GUDORF/	Date Considered	05/21/2022

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Application Number	17225357
Filing Date	2021-04-08
First Named Inventor	JAMES M. CANTER
Art Unit	
Examiner Name	
Attorney Docket Number	HART:032C4

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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).

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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.

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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	/Richard D. Egan/	Date (YYYY-MM-DD)	2021-09-02
Name/Print	Richard D. Egan	Registration Number	36788

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(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	JAMES M. CANTER
Art Unit	
Examiner Name	
Attorney Docket Number	HART:032C4

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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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	2	5377099		1994-12-27	Miyagawa	
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	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	9	6873966		2005-03-29	Babbitt et al.	
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	Filing Date	
	First Named Inventor	JAMES M. CANTER
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	Examiner Name	
	Attorney Docket Number	HART:032C4

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	1	20190213820		2019-07-11	Sebes et al.	
	2	20090166417		2009-07-02	Dammann et al.	
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	7	20180102013		2018-04-12	Spanos et al.	
	8	20090289115		2009-11-26	Kevin Chung et al.	
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	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	10	20170344538		2017-11-30	Hiroya Horai	
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	13	20090256703		2009-10-15	Steve Bolton	
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	1	0120562A2	WO		2001-03-22	Adler et al.		
	2	2004038632	WO		2004-05-06	Boldin		
	3	1020130185582	BR		2014-09-02	Ronaldo Nadaf		
	4	2012175758	WO		2012-12-27	Indra Sistemas, S.A.		

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	First Named Inventor	JAMES M. CANTER
	Art Unit	
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	5	102013018558-2 A2	BR		2014-09-02	Nadaf		

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	1	Kim et al., "Improved Support For Machine-Assisted Ballot-Level Audits", Usenix Journal Of Election Technology And Systems (JETS), Vol. 1, No. 1, August 2013, 18 pgs.	
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	3	Mohapatra et al., "Spell Checker For OCR", International Journal Of Computer Science And Information Technologies", Vol. 4, No. 1, 2013, 7 pgs.	
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	Examiner Name	
	Attorney Docket Number	HART:032C4

	9	Krawczyk et al., "HMAC: Keyed-Hashing For Message Authentication", Network Working Group, February 1997, 11 pgs.	
	10	Essex et al., "Hover: Trustworthy Elections With Hash-Only Verification", IEEE Computer And Reliability Societies, 2012, 7 pgs.	
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	14	Unisyn Voting Solutions, OpenElect FreedomVote Tablet (FVT), The Freedom to Adapt; 2017, 2 pgs.	
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	18	Declaration Of Carlos Cezar Cordeiro Pires, Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, 100 pgs.	
	19	Declaration Of Michael I. Shamos, Ph.D., J.D. Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, 175 pgs.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	20	Petitioner's Power Of Attorney, Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, 3 pgs.	
	21	File History For Patent No. 10,445,966, 172 pgs.	
	22	Canter et al., "Optical Character Recognition Of Voter Selections For Cast Vote Records", Serial No. 16/745,621, Filed January 17, 2020, 22 pgs.	
	23	Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, Decision Granting Institution Of Post-Grant Review 35 U.S.C. § 324, 37 C.F.R. § 42.4, September 2, 2020, 48 pgs.	
	24	Certified Translation of Brazil Patent Document BR-102013018558-2 A2, Nadaf, "Verification Ballot Printing And Collection Equipment And Equipment For Auditing And Counting Votes Printed On Verification Ballots For A Mechatronic Voting Model", Filed July 19, 2013, 158 pgs.	
	25	Election Systems & Software, LLC. v. Hart Intercivic, Inc., "Petitioner's Reply To Patent Owner's Response", Patent No. 10,445,966, February 17, 2021, 38 pgs.	
	26	Election Systems & Software, LLC. v. Hart Intercivic, Inc., "Video Conference Deposition Of Daniel P. Lopresti, Ph.D." , Patent No. 10,445,966, February 5, 2021, 87 pgs.	
	27	Federal Information Processing Standards Publication, "Digital Signature Standard (DSS)", Information Technology Laboratory, FIPS PUB 186-4, July 2013, 130 pgs.	
	28	Election Systems & Software, LLC. v. Hart Intercivic, Inc., "Supplemental Declaration Of Michael I. Shamos, Ph.D., J. D.", Patent No. 10,445,966, February 17, 2021, 34 pgs.	
	29	Esakov et al., "Issues In Automatic OCR Error Classification", Panasonic Technologies, Inc., December 31, 1994, 12 pgs.	
	30	Damerau, "A Technique For Computer Detection And Correction Of Spelling Errors", Communications Of The ACM, Vol. 7, No. 3, March 1964, 6 pgs.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	31	Seni et al., "Generalizing Edit Distance To Incorporate Domain Information: Handwritten Text Recognition As A Case Study", Pattern Recognition, Vol. 29, No. 3, 1996, 10 pgs.

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

EXAMINER SIGNATURE

Examiner Signature	/LAURA A GUDORF/	Date Considered	05/21/2022

*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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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Application Number	
	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

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	/Richard D. Egan/	Date (YYYY-MM-DD)	2021-04-08
Name/Print	Richard D. Egan	Registration Number	36788

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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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.

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	44	("10002481" OR "10147259" OR "10445966" OR "10573111" OR "10950078" OR "20020084325" OR "20050269406" OR "20060041468" OR "20090166417" OR "20090256703" OR "20090289115" OR "20100114674" OR "20110202464" OR "20140012635" OR "20140231513" OR "20170344538" OR "20180102013" OR "20180350180" OR "20190213820" OR "2612994" OR "3609685" OR "5377099" OR "5497318" OR "5625721" OR "5703972" OR "5726435" OR "5748807" OR "5764799" OR "6250548" OR "6873966" OR "6885758" OR "6971574" OR "7080779" OR "7306148" OR "7406201" OR "7635088" OR "7729991" OR "7988047" OR "8261986" OR "8991701" OR "9165417" OR "9361531" OR "9401059" OR "RE40449").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/04/08 11:22 AM
L2	22	((("HART") near3 ("INTERCIVIC") near3 ("INC"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/05/19 11:39 AM
L3	86	((("CANTER") near3 ("James")) OR (("TINNEY") near3 ("Drew")) OR (("KONOVALENKO")	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/19 11:39 AM

		near3 ("levgen"))).INV.					
L7	4	L3 AND recursi$4	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 11:39 AM
L8	2676	compar$3 SAME (OCR text) WITH (barcode (bar near2 code) encoded)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 12:22 PM
L9	761	compar$3 WITH (OCR text) WITH (barcode (bar near2 code) encoded)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 12:22 PM
L10	646	L9 AND @ay<"2019"	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 12:23 PM
L11	424	compar$3 WITH (OCR text) WITH (barcode (bar near2 code))	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 12:24 PM
L12	348	L11 AND @ay<"2019"	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 12:24 PM
L13	37	(Artificial Intelligence) More Like: US-20140231513-A1 Text: (CA-2806098-A1 OR US-8191764-B2 OR US-20080308633-A1 OR WO-2008113057-A1 OR WO-2008113058-A1 OR US-20080308634-A1 OR US-8136729-B2 OR US-20100230491-A1 OR US-7077314-B2 OR ES-2610983-B1 OR US-20220012971-A1 OR US-20210225109-A1 OR US-20130248599-A1 OR US-8991701-B2 OR US-7243846-B2 OR US-10789801-B2 OR US-8733646-B2 OR US-20060000906-A1 OR US-6968999-B2 OR US-20220012970-A1).did.	(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)	OR	ON	ON	2022/05/21 01:40 PM
L14	11	"20060000906"	(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,	OR	ON	ON	2022/05/21 01:50 PM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L16	27	L1 AND audit$4	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:27 PM
L17	2046	G07C13/00.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:34 PM
L18	12385	G06V30/40,10.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:34 PM
L19	829	G06K7/10346.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:34 PM
L20	224	G06K17/0032.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:34 PM
L21	15386	L17 L18 L19 L20	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:34 PM
L22	56	L21 AND L11	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/21 06:36 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Electronic Patent Application Fee Transmittal

Application Number:	17225357
Filing Date:	08-Apr-2021
Title of Invention:	Optical Character Recognition Of Voter Selections For Cast Vote Records
First Named Inventor/Applicant Name:	James M. Canter
Filer:	Richard D. Egan/Marty Jones
Attorney Docket Number:	HART:032C4

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	16	100	1600
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1600**

Electronic Acknowledgement Receipt

EFS ID:	43857796
Application Number:	17225357
International Application Number:	
Confirmation Number:	1030
Title of Invention:	Optical Character Recognition Of Voter Selections For Cast Vote Records
First Named Inventor/Applicant Name:	James M. Canter
Customer Number:	36275
Filer:	Richard D. Egan/Marty Jones
Filer Authorized By:	Richard D. Egan
Attorney Docket Number:	HART:032C4
Receipt Date:	24-SEP-2021
Filing Date:	08-APR-2021
Time Stamp:	12:55:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1600
RAM confirmation Number	E20219NC55513783
Deposit Account	101205
Authorized User	Marty Jones

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.21 (Miscellaneous fees and charges)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.16 (National application filing, search, and examination fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Preliminary Amendment	Preliminaryamendment.pdf	70068 316396318eac6ff7a801032697de0c0f6656b8ed	no	15
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37865 45b5a45c47bb7055d83d0dfd70cfab8b9b5b4b83	no	2
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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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	JAMES M. CANTER ET AL.
Filed:	APRIL 9, 2021
For:	OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS
Serial No.:	17/225,357
Group Art Unit:	UNKNOWN
Examiner:	UNKNOWN
Atty Docket No.:	HART:032C4

Electronically filed with the PTO

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

PRELIMINARY AMENDMENT

Please amend the application as follows.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

Amendments to the Claims

Please amend Claims 1, 17, 28 and 39 and add new claims 52-67 as follows:

1. (Currently Amended) A method for electronic voting using printed vote records, comprising:

generating a printed vote record of at least one vote selection of a voter;

providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection;

electronically capturing information from the printed vote record;

using optical character recognition (OCR) on at least a portion of the electronically captured information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's at least one vote selection;

comparing the first data set to a second data set; and

generating a cast vote record, which is to be a stored record of all of the voter's final vote selections and to be the voter's casted vote used for vote tabulation, the cast vote record indicating the voter's at least one vote selection, wherein, prior to generating ~~the~~ any cast vote record which is to be a stored record of all of the voter's final vote selections and to be the voter's casted vote used for vote tabulation, an accuracy of data to be cast is confirmed based at least in part on a comparison of the first data set and the second data set.

2. (Original) The method of claim 1, wherein the second data set comprises an election dictionary.

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3. (Original) The method of claim 1, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection, and wherein the second data set is generated at least in part from the encoded data.

4. (Original) The method of claim 3, wherein electronically capturing information from the printed vote record includes capturing the encoded data.

5. (Original) The method of claim 3, further comprising using an election dictionary to assist in confirming an accuracy of the first data set.

6. (Original) The method of claim 1, wherein the electronically capturing information from the printed vote record comprises electronically scanning the voter readable text.

7. (Original) The method of claim 6, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection, and wherein the electronically capturing information from the printed vote record further comprises electronically scanning the encoded data.

8. (Currently Amended) The method of claim 7, wherein the encoded data is contained in a visual representation of encoded data.[["]]

9. (Original) The method of claim 8, wherein the visual representation of encoded data is a bar code.

10. (Original) The method of claim 9, wherein the bar code is a one-dimensional bar code.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

11. (Original) The method of claim 9, wherein the bar code is a two-dimensional bar code.

12. (Original) The method of claim 11, wherein the two-dimensional bar code is a QR code

13. (Original) The method of claim 1, wherein the information captured from the printed voter record comprises the voter readable text indicating the voter's at least one vote selection and other information.

14. (Original) The method of claim 13, wherein the other information is contained in a bar code.

15. (Original) The method of claim 13, wherein the second data set is based at least in part on the other information.

16. (Original) The method of claim 1, wherein electronically capturing information from the printed vote record comprises capturing an image of the printed vote record.

17. (Currently Amended) A method for electronic voting using printed vote records, comprising:

generating a printed vote record of at least one vote selection of a voter;

providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection;

electronically capturing first information from the printed vote record;

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

using optical character recognition (OCR) on the first information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's at least one vote selection;

electronically capturing second information from the printed vote record, to generate a second data set, the second information comprising encoded data;

comparing the first data set to a second data set; and

generating a cast vote record indicating the voter's at least one vote selection, the cast vote record being a stored record of all of the voter's final vote selections, wherein, prior to generating ~~the~~ any cast vote record which is to be a stored record of all of the voter's final vote selections, an accuracy of data to be cast is confirmed based at least in part on a comparison of the first data set and the second data set.

18. (Original) The method of claim 17, further comprising using an election dictionary to assist in confirming the accuracy of the data to be cast.

19. (Original) The method of claim 17, wherein the encoded data is contained in a visual representation of encoded data.

20. (Original) The method of claim 19, wherein the visual representation of encoded data is a bar code.

21. (Original) The method of claim 17, further comprising confirming an accuracy of an optical character recognition (OCR) by utilizing a first hash produced from the first data set.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

22. (Original) The method of claim 17, further comprising confirming an accuracy of an optical character recognition (OCR) by comparing a first hash produced from the first data set to a second hash, wherein the second hash is at least part of the encoded data.

23. (Original) The method of claim 17, wherein the comparison of the first data set and the second data set is used to confirm an accuracy of an optical character recognition (OCR) process by confirming that the at least one vote selection that the first data set is based at least in part on matches the at least one vote selection that the second data set is based at least in part on.

24. (Original) The method of claim 17, wherein the cast vote record is based on the first data set.

25. (Original) The method of claim 17, wherein using optical character recognition (OCR) on the first information to generate a first data set further comprises recursively modifying an OCR process applied to the voter readable text.

26. (Original) The method of claim 17, wherein the cast vote record is configured to be tabulated with other records to indicate the outcome of an election.

27. (Original) The method of claim 26, wherein after the cast vote record is generated, the cast vote record is utilized during a tabulation of an election.

28. (Currently Amended) An electronic voting system for using printed vote records, comprising:

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

a printer configured to generate a printed vote record of at least one vote selection of a voter, the printed vote record including voter readable text indicating the voter's at least one vote selection;

a scanner configured to electronically capture first information from the printed vote record, the first information including the voter readable text; and

a processor configured to use optical character recognition (OCR) on the first information to generate a first data set based at least in part on the voter readable text indicating the voter's at least one vote selection,

wherein the processor is configured to recursively modify the first data set, and

wherein the processor is further configured to provide a cast vote record which is to be a stored record of all of the voter's final vote selection indicating the voter's at least one vote selection based on the first data set.

29. (Original) The system of claim 28,

wherein the scanner is further configured to electronically capture second information from the printed vote record, to generate a second data set, the second information comprising encoded data, and

wherein the processor is further configured to generate an OCR hash from the first data set, and to compare the OCR hash to an encoded hash extracted from the encoded data on the printed vote record.

30. (Original) The system of claim 29, wherein the processor is configured to recursively modify the first data set by generating an additional OCR hash for comparison to the encoded hash until the additional OCR hash matches the encoded hash.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

31. (Original) The system of claim 29, wherein the processor is configured to recursively modify the first data set by, in response to a mismatch between the OCR hash and the encoded hash, selecting a valid alternate OCR output.

32. (Original) The system of claim 28, wherein the processor is configured to recursively modify the first data set by generating an OCR string from the voter readable text, and comparing the OCR string to at least one comparison string.

33. (Original) The system of claim 32, wherein the comparison string comprises data from an election dictionary including at least a part of a candidate's name and additional data.

34. (Original) The system of claim 28, wherein the processor is configured to recursively modify the first data set by:

generating an OCR string from the voter readable text; and

calculating a distance between the OCR string and at least one comparison string.

35. (Original) The system of claim 34, wherein the distance is a Levenshtein distance.

36. (Original) The system of claim 34, wherein the processor is further configured to recursively modify the first data set by identifying an alternative comparison string having distance below a defined threshold.

37. (Original) The system of claim 36, wherein the distance is a Levenshtein distance.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

38. (Original) The system of 28,

wherein the scanner is further configured to electronically capture second information from the printed vote record, to generate a second data set, the second information comprising encoded data, and

wherein the processor is further configured to confirm, prior to generating the cast vote record, an accuracy of data to be cast based at least in part on a comparison of the first data set and the second data set.

39. (Currently Amended) A method for electronic voting using printed vote records, comprising:

generating a printed vote record of at least one vote selection of a voter;

providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection;

electronically capturing first information from the printed vote record;

using optical character recognition (OCR) on the first information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's at least one vote selection;

electronically capturing second information from the printed vote record, to generate a second data set, the second information comprising encoded data;

comparing the first data set to a second data set;

confirming an accuracy of the at least one vote selection of the voter based at least in part on a comparison of the first data set and the second data set; ~~and~~

after confirming an accuracy of the at least one vote selection, generating a cast vote record <u>which is to be a stored record of all of the voter's final vote selections and which is to be the voter's casted vote used for vote</u>

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

tabulation, the cast vote record indicating the voter's at least one vote selection as determined by the first data set; and

~~wherein the cast vote record is configured to be utilized for~~ tabulating ~~of~~ an election utilizing the cast vote record.

40. (Original) The method of claim 39, further comprising using an election dictionary to assist in confirming an accuracy of the first data set.

41. (Original) The method of claim 39, wherein comparing the first data set to the second data set comprises comparing a first hash produced from the first data set to a second hash extracted from the encoded data on the printed vote record.

42. (Original) The method of claim 39, further comprising recursively modifying the first data set, prior to generating the cast vote record.

43. (Original) The method of claim 42, wherein the recursively modifying the first data set comprises generating an additional OCR hash for comparison to a second hash extracted from the encoded data on the printed vote record, until the additional OCR hash matches the second hash.

44. (Original) The method of claim 42, wherein recursively modifying the first data set further comprises: based on the comparison of the first data set to the second data set, selecting a valid alternate OCR output based on the OCR process applied to the voter readable text.

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45. (Original) The method of claim 42, wherein recursively modifying the first data set further comprises generating an OCR string from the voter readable text, and comparing the OCR string to at least one comparison string.

46. (Original) The method of claim 45, wherein the comparison string comprises data from an election dictionary including at least a part of a candidate's name and additional data.

47. (Original) The method of claim 39, wherein generating the first data set further comprises:

generating an OCR string from the voter readable text; and

calculating a distance between the OCR string and at least one comparison string.

48. (Original) The method of claim 47, wherein the distance is a Levenshtein distance.

49. (Original) The method of claim 47, wherein generating the first data set further comprises identifying an alternative comparison string having distance below a defined threshold.

50. (Original) The method of claim 49, wherein the distance is a Levenshtein distance.

51. (Original) The method of claim 39, further comprising: utilizing the cast vote record in tabulating the results of an election.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

52. (New) The method of claim 39, further comprising utilizing the printer vote record for auditing the election, the auditing of the election being separate from the tabulation of the election.

53. (New) The method of claim 39, wherein the cast vote record provides the voter's sole casted vote used for vote tabulation.

54. (New) The method of claim 1, wherein the cast vote record provides the voter's sole casted vote used for vote tabulation.

55. (New) The method of claim 54, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection, and wherein the second data set is generated at least in part from the encoded data.

56. (New) The method of claim 55, wherein electronically capturing information from the printed vote record includes capturing the encoded data.

57. (New) The method of claim 56, wherein the encoded data is contained in a visual representation of encoded data.

58. (New) The method of claim 54, wherein the information captured from the printed voter record comprises the voter readable text indicating the voter's at least one vote selection and other information.

59. (New) The method of claim 58, wherein the other information is contained in a bar code.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

60. (New) The method of claim 58, wherein the second data set is based at least in part on the other information.

61. (New) The method of claim 17, wherein the cast vote record provides the voter's casted vote used for vote tabulation.

62. (New) The method of claim 61, wherein the cast vote record provides the voter's sole casted vote used for vote tabulation.

63. (New) The method of claim 62, further comprising confirming an accuracy of an optical character recognition (OCR) by utilizing a first hash produced from the first data set.

64. (New) The method of claim 62, further comprising confirming an accuracy of an optical character recognition (OCR) by comparing a first hash produced from the first data set to a second hash, wherein the second hash is at least part of the encoded data.

65. (New) The method of claim 62, wherein the comparison of the first data set and the second data set is used to confirm an accuracy of an optical character recognition (OCR) process by confirming that the at least one vote selection that the first data set is based at least in part on matches the at least one vote selection that the second data set is based at least in part on.

66. (New) The method of claim 62, wherein the cast vote record is based on the first data set.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

67. (New) The method of claim 62, wherein using optical character recognition (OCR) on the first information to generate a first data set further comprises recursively modifying an OCR process applied to the voter readable text.

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

REMARKS

Please charge $1,600.00 for 16 additional dependent claims. Should any additional fees under 37 CFR 1.16-1.21 be required for any reason relating to the enclosed materials, the Commissioner is authorized to deduct such fees from Deposit Account No. 10-1205/HART:032C4. The examiner is invited to contact the undersigned at the phone number indicated below with any questions or comments, or to otherwise facilitate expeditious and compact prosecution of the application.

Respectfully submitted,

/Richard D. Egan/
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Ex. 2005 / PGR2025-00066 / Page 64 of 140
Election Systems & Software, LLC v. Hart Intercivic, Inc.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/225,357	Filing Date 04/08/2021	☐ 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 $480 =	
☐ 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	09/24/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 67	Minus	** 51	= 16		x $100 =	1600
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 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	1600

		(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.	LDRC
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/EVA V GILLIS/
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(Not for submission under 37 CFR 1.99)

Application Number	17225357
Filing Date	2021-04-08
First Named Inventor	JAMES M. CANTER
Art Unit	
Examiner Name	
Attorney Docket Number	HART:032C4

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17225357
	Filing Date	2021-04-08
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	1	Written Decision, Election Systems & Software, LLC. v. Hart InterCivic, Inc., PGR2020-00031, Patent No. 10,445,966, 86 pgs.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17225357
	Filing Date	2021-04-08
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

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	/Richard D. Egan/	Date (YYYY-MM-DD)	2021-09-02
Name/Print	Richard D. Egan	Registration Number	36788

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 Acknowledgement Receipt

EFS ID:	43675507
Application Number:	17225357
International Application Number:	
Confirmation Number:	1030
Title of Invention:	Optical Character Recognition Of Voter Selections For Cast Vote Records
First Named Inventor/Applicant Name:	James M. Canter
Customer Number:	36275
Filer:	Richard D. Egan/Marty Jones
Filer Authorized By:	Richard D. Egan
Attorney Docket Number:	HART:032C4
Receipt Date:	02-SEP-2021
Filing Date:	08-APR-2021
Time Stamp:	17:13:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	1035058 e3ef7c1d887e98d731265b229937af642eb6867e	no	4

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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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/225,357	04/08/2021	James M. Canter	HART:032C4

CONFIRMATION NO. 1030

PUBLICATION NOTICE

36275
Egan, Enders & Huston LLP.
1101 S. Capital of Texas Highway
Bldg C, Suite 200
Austin, TX 78746

OC000000127161019

Title: Optical Character Recognition Of Voter Selections For Cast Vote Records

Publication No.US-2021-0225109-A1
Publication Date:07/22/2021

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The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/225,357	04/08/2021	2876	5400	HART:032C4	51	4

CONFIRMATION NO. 1030

FILING RECEIPT

36275
Egan, Enders & Huston LLP.
1101 S. Capital of Texas Highway
Bldg C, Suite 200
Austin, TX 78746

OC000000124875363

Date Mailed: 04/15/2021

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.

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Inventor(s)

James M. Canter, Austin, TX;
Drew E. Tinney, Austin, TX;
Ievgen Konovalenko, Austin, TX;

Applicant(s)

Hart InterCivic, Inc., Austin, TX;

Power of Attorney: The patent practitioners associated with Customer Number 36275

Domestic Priority data as claimed by applicant

This application is a CON of 16/919,267 07/02/2020
which is a CON of 16/745,621 01/17/2020 PAT 10950078
which is a CON of 16/560,222 09/04/2019 PAT 10573111
which is a CON of 16/239,607 01/04/2019 PAT 10445966
which claims benefit of 62/711,212 07/27/2018

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.

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Projected Publication Date: 07/22/2021
Non-Publication Request: No
Early Publication Request: No
Title

Optical Character Recognition Of Voter Selections For Cast Vote Records

Preliminary Class

235

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/225,357

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	51 minus 20 =	* 31			OR	x 100 =	3100
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1				x 480 =	480
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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	5400

APPLICATION AS AMENDED - PART II

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

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** 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 found in the appropriate box in column 1.

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. 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	
Filing Date	
First Named Inventor	JAMES M. CANTER
Art Unit	
Examiner Name	
Attorney Docket Number	HART:032C4

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	7306148		2007-12-11	Morganstein	
	2	5377099		1994-12-27	Miyagawa	
	3	6885758		2005-04-26	Bayer	
	4	5726435		1998-03-10	Hara et al.	
	5	2612994		1949-10-20	Woodland et al.	
	6	10147259		2018-12-04	Dvorak	
	7	10002481		2018-06-19	Seibel et al.	
	8	9165417		2015-10-20	Valles Fontanals et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	9	6873966		2005-03-29	Babbitt et al.	
	10	7729991		2010-06-01	Rodriguez et al.	
	11	RE40449		2008-08-05	Provitola et al.	
	12	6250548		2001-06-26	McClure et al.	
	13	5764799		1998-06-09	Hong et al.	
	14	9361531		2016-06-07	Stella	
	15	3609685		1971-09-28	Deutsch	
	16	9401059		2016-07-26	Backert et al.	
	17	6971574		2005-12-06	Herskowitz	
	18	7080779		2006-07-25	Cummings	
	19	7406201		2008-07-29	Heilper et al.	

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	Application Number	
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	First Named Inventor	JAMES M. CANTER
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	Attorney Docket Number	HART:032C4

	20	7635088		2009-12-22	Kevin Chung et al.	
	21	7988047		2011-08-02	Kevin Chung at al.	
	22	8261986		2012-09-11	Kevin Chung et al.	
	23	8991701		2015-03-31	Steve Bolton et al.	
	24	5497318		1996-03-05	Takayoshi Miyagawa et al.	
	25	10445966		2019-10-15	Canter et al.	
	26	10573111		2020-02-25	Canter et al.	
	27	5748807		1998-05-05	Lopresti et al.	
	28	5703972		1997-12-30	Lopresti et al.	
	29	5625721		1997-04-29	Lopresti et al.	
	30	10950078		2021-03-16	Canter et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

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	20190213820		2019-07-11	Sebes et al.	
	2	20090166417		2009-07-02	Dammann et al.	
	3	20060041468		2006-02-23	Reardon	
	4	20140012635		2014-01-09	Joyce et al.	
	5	20100114674		2010-05-06	Daza Fernandez et al.	
	6	20110202464		2011-08-18	Carbullido	
	7	20180102013		2018-04-12	Spanos et al.	
	8	20090289115		2009-11-26	Kevin Chung et al.	
	9	20180350180		2018-12-06	Daniel Onischuk	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

	10	20170344538		2017-11-30	Hiroya Horai	
	11	20140231513		2014-08-21	Sean Brockhouse et al.	
	12	20020084325		2002-07-04	David C. Reardon	
	13	20090256703		2009-10-15	Steve Bolton	
	14	20050269406		2005-12-08	Andrew C. Neff	

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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	0120562A2	WO		2001-03-22	Adler et al.		
	2	2004038632	WO		2004-05-06	Boldin		
	3	1020130185582	BR		2014-09-02	Ronaldo Nadaf		
	4	2012175758	WO		2012-12-27	Indra Sistemas, S.A.		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	JAMES M. CANTER
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	Examiner Name	
	Attorney Docket Number	HART:032C4

	5	102013018558-2 A2	BR		2014-09-02	Nadaf		

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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.	T5
	1	Kim et al., "Improved Support For Machine-Assisted Ballot-Level Audits", Usenix Journal Of Election Technology And Systems (JETS), Vol. 1, No. 1, August 2013, 18 pgs.	
	2	Keller et al., "A PC-Based Open-Source Voting Machine With An Accessible Voter-Verifiable Paper Ballot", Usenix, 2005, 12 pgs.	
	3	Mohapatra et al., "Spell Checker For OCR", International Journal Of Computer Science And Information Technologies", Vol. 4, No. 1, 2013, 7 pgs.	
	4	Bunke, "A Fast Algorithm For Finding The Nearest Neighbor Of A Word In A Dictionary", IAM-93-025, November 1993, 16 pgs.	
	5	Hassan et al., "Language Independent Text Correction Using Finite State Automata", IBM Cairo Technology Development Center, 2008, 6 pgs.	
	6	Toledo, "Election Tally Sheets Processing System", IAPR Workshop, 2016, 5 pgs.	
	7	Ashford, "QR Codes And Academic Libraries: Reaching Mobile Users", Faculty Publications- George Fox University Libraries, 2010, 6 pgs.	
	8	Barrera, "Optical Encryption And QR Codes: Secure And Noise-Free Information Retrieval", Optics Express, 2013, 6 pgs.	

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	9	Krawczyk et al., "HMAC: Keyed-Hashing For Message Authentication", Network Working Group, February 1997, 11 pgs.	
	10	Essex et al., "Hover: Trustworthy Elections With Hash-Only Verification", IEEE Computer And Reliability Societies, 2012, 7 pgs.	
	11	Preneel, "The First 30 Years Of Cryptographic Hash Functions And The NIST SHA-3 Competition", Katholieke Universiteit Leuven and IBBT, Dept. Electrical Engineering, 2010, 15 pgs.	
	12	Shamos, "Electronic Voting Glossary", Carnegie Mellon University, 2011, 8 pgs.	
	13	Quesenbery, "Making Voting Universal (And Secure)", Civic Designing, Medium.com, Printed From Internet January 2019, 9 pgs.	
	14	Unisyn Voting Solutions, OpenElect FreedomVote Tablet (FVT), The Freedom to Adapt; 2017, 2 pgs.	
	15	Election Systems & Software, ExpressVote XL, Full face Universal Voting System, 2016, 2 pgs.	
	16	Election Systems & Sofware, ExpressVote, Universal Voting System As A Marker, 2016, 2 pgs.	
	17	Petition For Post Grant Review Of U.S. Patent No. 10,445,966, Election Systems & Software, LLC. v. Hart InterCivic, Inc., 99 pgs.	
	18	Declaration Of Carlos Cezar Cordeiro Pires, Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, 100 pgs.	
	19	Declaration Of Michael I. Shamos, Ph.D., J.D. Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, 175 pgs.	

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	Examiner Name	
	Attorney Docket Number	HART:032C4

	20	Petitioner's Power Of Attorney, Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, 3 pgs.	
	21	File History For Patent No. 10,445,966, 172 pgs.	
	22	Canter et al., "Optical Character Recognition Of Voter Selections For Cast Vote Records", Serial No. 16/745,621, Filed January 17, 2020, 22 pgs.	
	23	Election Systems & Software, LLC. v. Hart InterCivic, Inc., Patent No. 10,445,966, Decision Granting Institution Of Post-Grant Review 35 U.S.C. § 324, 37 C.F.R. § 42.4, September 2, 2020, 48 pgs.	
	24	Certified Translation of Brazil Patent Document BR-102013018558-2 A2, Nadaf, "Verification Ballot Printing And Collection Equipment And Equipment For Auditing And Counting Votes Printed On Verification Ballots For A Mechatronic Voting Model", Filed July 19, 2013, 158 pgs.	
	25	Election Systems & Software, LLC. v. Hart Intercivic, Inc., "Petitioner's Reply To Patent Owner's Response", Patent No. 10,445,966, February 17, 2021, 38 pgs.	
	26	Election Systems & Software, LLC. v. Hart Intercivic, Inc., "Video Conference Deposition Of Daniel P. Lopresti, Ph.D." , Patent No. 10,445,966, February 5, 2021, 87 pgs.	
	27	Federal Information Processing Standards Publication, "Digital Signature Standard (DSS)", Information Technology Laboratory, FIPS PUB 186-4, July 2013, 130 pgs.	
	28	Election Systems & Software, LLC. v. Hart Intercivic, Inc., "Supplemental Declaration Of Michael I. Shamos, Ph.D., J. D.", Patent No. 10,445,966, February 17, 2021, 34 pgs.	
	29	Esakov et al., "Issues In Automatic OCR Error Classification", Panasonic Technologies, Inc., December 31, 1994, 12 pgs.	
	30	Damerau, "A Technique For Computer Detection And Correction Of Spelling Errors", Communications Of The ACM, Vol. 7, No. 3, March 1964, 6 pgs.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Examiner Name	
	Attorney Docket Number	HART:032C4

	31	Seni et al., "Generalizing Edit Distance To Incorporate Domain Information: Handwritten Text Recognition As A Case Study", Pattern Recognition, Vol. 29, No. 3, 1996, 10 pgs.

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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.

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	Application Number	
	Filing Date	
	First Named Inventor	JAMES M. CANTER
	Art Unit	
	Examiner Name	
	Attorney Docket Number	HART:032C4

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	/Richard D. Egan/	Date (YYYY-MM-DD)	2021-04-08
Name/Print	Richard D. Egan	Registration Number	36788

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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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.

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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.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS
First Named Inventor/Applicant Name:	JAMES M. CANTER
Filer:	Richard D. Egan/Marty Jones
Attorney Docket Number:	HART:032C4

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	31	100	3100
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	480	480
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**5400**

Electronic Acknowledgement Receipt

EFS ID:	42399667
Application Number:	17225357
International Application Number:	
Confirmation Number:	1030
Title of Invention:	OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS
First Named Inventor/Applicant Name:	JAMES M. CANTER
Customer Number:	36275
Filer:	Richard D. Egan/Marty Jones
Filer Authorized By:	Richard D. Egan
Attorney Docket Number:	HART:032C4
Receipt Date:	08-APR-2021
Filing Date:	
Time Stamp:	12:55:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$5400
RAM confirmation Number	E202148C56113728
Deposit Account	101205
Authorized User	Marty Jones

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	1823444 8faba30d96e1deb802d6a8979c4ba005888d2162	no	9
Warnings:					
Information:					
2	Power of Attorney	POA.pdf	234997 13d8abbb5c25f2baddfd8782dacb0873bacba173	no	2
Warnings:					
Information:					
3	Oath or Declaration filed	Decs.pdf	319811 adb261580c49407ed1e855224c2d374fd0f8da6b	no	3
Warnings:					
Information:					
4		PatentApplication.pdf	119451 d90ce435185f119329b35f49b05ef4ab63048508	yes	24

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	13
Claims	14	23
Abstract	24	24

Warnings:					
Information:					
5	Drawings-only black and white line drawings	Figures.pdf	309023 5a1279ffb0f9939cff3cfa455720fbfaba48f0e4	no	4

Warnings:					
Information:					
6	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	1038623 204e3021cc52252ee28ac6974edb0bf4b1f32177	no	11
Warnings:					
Information:					
7	Foreign Reference	B1.pdf	8642415 624d668e8f886f33a5fdd42bfdea74d8eea2e018	no	75
Warnings:					
Information:					
8	Foreign Reference	B2.pdf	6681697 ce05d9d0fc543cac5d3783e699dd2b450869ecd7	no	77
Warnings:					
Information:					
9	Foreign Reference	B3.pdf	25265615 dd4e74ac157cd3d8b3213d56ab0f1d64cbca65d0	no	158
Warnings:					
Information:					
10	Foreign Reference	B4.pdf	1139856 635ed45bae88202ada29fabb68b99a54fa1d107e	no	26
Warnings:					
Information:					
11	Foreign Reference	B5.pdf	4124779 24069df825c5d61804f89090fa19fb12f5f87467	no	29
Warnings:					
Information:					
12	Non Patent Literature	C1.pdf	4019683 6359e577d1a63387afc17c07063d2dfc04b1daa7	no	18
Warnings:					
Information:					

13	Non Patent Literature	C2.pdf	589610 063f8aa6881d072d78a0786976d37b64acd69196	no	12
Warnings:					
Information:					
14	Non Patent Literature	C3.pdf	1106578 d38838717ee840d7f513e847d949db7c0a14a2bf	no	7
Warnings:					
Information:					
15	Non Patent Literature	C4.pdf	338094 0b28153d05459d9e2b3a8a016522941f476a6cca	no	16
Warnings:					
Information:					
16	Non Patent Literature	C5.pdf	3049191 a3fc446894abeb18928e9be671d0d85a90677bb5	no	6
Warnings:					
Information:					
17	Non Patent Literature	C6.pdf	4035115 805797f779ae84ec016301b737c4db6dabafc471	no	5
Warnings:					
Information:					
18	Non Patent Literature	C7.pdf	3689320 38eacd23df6d6f67eac54573ec28da55525fe0e6	no	6
Warnings:					
Information:					
19	Non Patent Literature	C8.pdf	3204748 3b7e145b6d3425f49d4622b6f99f362074408c6e	no	6
Warnings:					
Information:					

20	Non Patent Literature	C9.pdf	2183658 09d0709c3e69bcee014aaaa880e8715fd0f48474	no	11
Warnings:					
Information:					
21	Non Patent Literature	C10.pdf	2837218 371b5e3e320f6b9d900a09e6de4cfbde1b682665	no	7
Warnings:					
Information:					
22	Non Patent Literature	C11.pdf	1725916 5abd0c16c027466b2d207dcdd53ac8759b9d283f	no	15
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23	Non Patent Literature	C12.pdf	876592 efe7d6dd91fb1fabc93a2fddca9230bc771cd460	no	8
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Information:					
24	Non Patent Literature	C13.pdf	411397 e16c512a9d8df5325642532257b83ec36d9e400e	no	9
Warnings:					
Information:					
25	Non Patent Literature	C14.pdf	1646347 a34ef45ce5aa4643769c638a1976a63f1e8b6f5f	no	2
Warnings:					
Information:					
26	Non Patent Literature	C15.pdf	1223949 d9f7713d252ab5df5a9bf6c077f0f4934b51de6e	no	2
Warnings:					
Information:					

27	Non Patent Literature	C16.pdf	1206463 70455a999bc99e30fa4acc668df34f6cde67e978	no	2
Warnings:					
Information:					
28	Non Patent Literature	C17.pdf	994970 496851d106eb0ea702f31c096ed95c7fe2409802	no	99
Warnings:					
Information:					
29	Non Patent Literature	C18.pdf	22141203 d3931d9306d13907631ee956e172606c5ef3af95	no	100
Warnings:					
Information:					
30	Non Patent Literature	C19.pdf	2342016 8f56063ebe1e90d45835372b80f79da6fd5fb18c	no	175
Warnings:					
Information:					
31	Non Patent Literature	C20.pdf	1851137 53c02a35fe702e455f64062578986b3d18d4ef13	no	3
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Information:					
32	Non Patent Literature	C21.pdf	12303301 64e1923904c0adad9c3536635da04b1e44046c57	no	172
Warnings:					
Information:					
33	Non Patent Literature	C22.pdf	1040600 9ec4089a909ddae048e94a1ce20c71ca9423da67	no	22
Warnings:					
Information:					

34	Non Patent Literature	C23.pdf	817448 7015e150245196dc573763e0ee29e60d64991312	no	48
Warnings:					
Information:					
35	Non Patent Literature	C24.pdf	25235951 7f16ae731ab37a47111ad2988401cd26f40724f0	no	158
Warnings:					
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36	Non Patent Literature	C25.pdf	495508 421fe832d143429fad41d94e90aaac8d838131dc	no	38
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37	Non Patent Literature	C26.pdf	1425057 5c2d82f51e417bacc6033114cadf3952b6bd7f45	no	87
Warnings:					
Information:					
38	Non Patent Literature	C27.pdf	837238 c3b899f011d80c9604bf74b5f884fac69f15a29d	no	130
Warnings:					
Information:					
39	Non Patent Literature	C28.pdf	314486 de8633508026d94d819fb0d7352e68eb4f1d37f6	no	34
Warnings:					
Information:					
40	Non Patent Literature	C29.pdf	2639641 62156e802f0b5e094c6207681feed9ea1b3206bf	no	12
Warnings:					
Information:					

41	Non Patent Literature	C30.pdf	1283412 1f0d11baa6539d4c0c881497a754b61834fa5fc1	no	6
Warnings:					
Information:					
42	Non Patent Literature	C31.pdf	1491165 0b51bb6bdb9c1a978894bd6efe0b351fee2a23d7	no	10
Warnings:					
Information:					
43	Fee Worksheet (SB06)	fee-info.pdf	37647 86afe42df9a085c28895b844a9df95b7f60a8da1	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	157094370	

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New Applications Under 35 U.S.C. 111

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.

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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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	M.	Canter	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Austin	TX	US

Mailing Address of Inventor:

Address 1	10603 Winchelsea Drive
Address 2	
City	Austin
State/Province	TX
Postal Code	78750
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Drew	E.	Tinney	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Austin	TX	US

Mailing Address of Inventor:

Address 1	1501 Arcadia Avenue
Address 2	
City	Austin
State/Province	TX
Postal Code	78757
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ievgen		Konovalenko	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

City	Austin	State/Province	TX	Country of Residence	US

Mailing Address of Inventor:

Address 1	14302 Terisu Lane		
Address 2			
City	Austin	**State/Province**	TX
Postal Code	78728	**Country**	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	36275		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records		
Attorney Docket Number	HART:032C4	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	4	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	36275		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16919267	2020-07-02

Prior Application Status	Patented		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16919267	Continuation of	16745621	2020-01-17	10950078	2021-03-16

Prior Application Status	Patented		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16745621	Continuation of	16560222	2019-09-04	10573111	2020-02-25

Prior Application Status	Patented		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16560222	Continuation of	16239607	2019-01-04	10445966	2019-10-15

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16239607	Claims benefit of provisional	62711212	2018-07-27

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Hart InterCivic, Inc.		
Mailing Address Information For Applicant:			
Address 1	15550 Wells Port Drive		
Address 2			
City	Austin	**State/Province**	TX
Country	US	Postal Code	78728
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Richard D. Egan/			Date (YYYY-MM-DD)	2021-04-08
First Name	Richard D.	Last Name	Egan	Registration Number	36788

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	HART:032C4
	Application Number	
Title of Invention	Optical Character Recognition Of Voter Selections For Cast Vote Records	

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Application Number	UNKNOWN
Filing Date	HEREWITH
First Named Inventor	JAMES M. CANTER ET AL.
Title	OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS
Art Unit	UNKNOWN
Examiner Name	UNKNOWN
Attorney Docket Number	HART:032C4

SIGNATURE of Applicant or Patent Practitioner

Signature	/Richard D. Egan/	Date (Optional)	
Name	Richard D. Egan	Registration Number	36788
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

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Application Number	Filing Date

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Hart InterCivic, Inc.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

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SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	4/5/17
Name	James Carter		
Title	Vice President of Engineering		

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DECLARATION (37 CFR 1.63) FOR UTILITY APPLICATION USING APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention:

OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS

As the below named inventor, I hereby declare that:

- This Declaration is directed to:

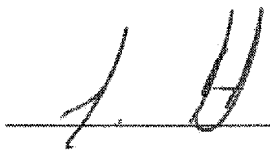
  ☒ The attached application, or
  ☐ United States application or PCT international application number filed on

- The above-identified application was made or authorized to be made by me.
- I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
- I further declare that I have reviewed and understand the contents of the above-identified application, including the claims.
- I acknowledge my duty to disclose to the United States Patent and Trademark Office (hereinafter "the Office") all information known to me to be material to patentability of the subject-matter which is claimed as defined in 37 C.F.R. §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

LEGAL NAME OF INVENTOR

Inventor: James M. Canter Date: 1/3/2013

Signature 

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

DECLARATION (37 CFR 1.63) FOR UTILITY APPLICATION USING APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention:

OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS

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- The above-identified application was made or authorized to be made by me.
- I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
- I further declare that I have reviewed and understand the contents of the above-identified application, including the claims.
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LEGAL NAME OF INVENTOR

Inventor: Ievgen Konovalenko Date: 11/3/2019

Signature

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Election Systems & Software, LLC v. Hart Intercivic, Inc.

DECLARATION (37 CFR 1.63) FOR UTILITY APPLICATION USING APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention:

OPTICAL CHARACTER RECOGNITION OF VOTER SELECTIONS FOR CAST VOTE RECORDS

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- The above-identified application was made or authorized to be made by me.
- I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
- I further declare that I have reviewed and understand the contents of the above-identified application, including the claims.
- I acknowledge my duty to disclose to the United States Patent and Trademark Office (hereinafter "the Office") all information known to me to be material to patentability of the subject-matter which is claimed as defined in 37 C.F.R. §1.56.

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LEGAL NAME OF INVENTOR

Inventor: Drew E. Tinney Date: 1/3/2019

Signature

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Patent Application for

Optical Character Recognition of Voter Selections for Cast Vote Records

Inventors: James M. Canter, Drew E. Tinney, Ievgen Konovalenko

BACKGROUND OF THE INVENTION

[0001] This application claims priority to Patent Application No. 16/919,267 filed July 2, 2020 which claims priority to Patent Application No. 16/745,621 filed January 17, 2020, now Patent No. 10,950,078, which claims priority to Patent Application No. 16/560,222 filed September 4, 2019, now Patent No. 10,573,111, which claims priority to Patent Application No. 16/239,607 filed January 4, 2019, now Patent No. 10,445,966, which claims priority to Provisional Patent Application No. 62/711,212 filed July 27, 2018, the disclosures all of which are expressly incorporated herein by reference.

[0002] The present disclosure relates to the voting systems for elections. More specifically, it provides a system and method for providing paper records of voter selections and generating cast vote records from those paper records.

[0003] A variety of electronic voting systems are well known. Electronic systems include, for example, direct recording electronic (DRE) voting systems that electronically record votes to directly create an electronic cast vote record. Electronic systems also include, for example, systems in which paper vote records are generated based on a voter's electronic vote selections, with the paper vote record then being scanned for creation of the electronic cast vote record and electronic tabulation. As used herein, an electronic cast vote record is an electronic record that indicates the determined voter's choice or selection in a manner determined in accordance with the voting system. Thus, an electronic cast vote record is an electronic record of a voter's cast voting selections and may be used in the vote tabulation process.

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[0004] The use of paper records in an electronic voting allows the creation of a paper trail of voter selections, for example for use by an elections office for audit purposes. Such voting systems have also been called "hybrid voting" as it is a cross between all electronic DRE voting and paper-based hand-marked ballots. Such hybrid systems provide an electronic voting system in which a printed vote record (PVR) is produced (allowing a paper record to be an official record), and then the PVR is scanned on a digital scanner for cast vote record creation. The PVR may be full sized sheets of paper (for example standard 8.5 x 11 inch or 8.25 x 14 inch paper stock) or may be other specialized sizes. Traditionally, the PVR contains a barcode that is encoded with the voter's vote selections. The barcode is then scanned with a scanner and decoded to generate the electronic cast vote record. It has been found though, that some voters may find such a process to lack transparency as the voter cannot readily review the barcode to confirm the encoded data matches the voter's vote selections.

[0005] It would be desirable to provide an electronic voting system that utilizes PVRs in a manner that provides better transparency to the voter.

SUMMARY OF THE INVENTION

[0006] In one embodiment, the present disclosure describes an electronic voting system that utilizes printed vote records (PVRs) in which a voter's vote selections are recorded in voter readable characters. Optical character recognition (OCR) techniques may then be utilized to scan the PVR to record the voter's selections. The OCR data is then utilized to generate the cast vote record. Thus, the electronic voting system directly interprets the voter selections from the PVR just as the voter sees the data. In this manner "what you see is what you get" printed vote record data is provided for a voter's viewing and that same data is used to generate the cast vote record.

[0007] Further, the OCR process utilized accounts for and corrects for potential OCR errors. In one embodiment, an election dictionary is provided of the potential vote choices. Thus, for example, candidate names may be entered into the election

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dictionary and utilized for pattern matching to the OCR results. To further ensure accuracy (and address candidates which may have the same or similar names), the sequence number affiliated with a particular candidate may be utilized. Further, the line number (or even the contest title itself) on the PVR may also be utilized as a contest identifier. In one embodiment, the OCR'ed name and additional data may be utilized together as the key into the election dictionary. The additional data may be data related to a candidate, but being more than just the candidate name. For example, in some embodiments, the additional data may be the sequence number and/or line number data. Thus, for example, the OCR'ed name and sequence number, the OCR'ed name and line number, or the OCR'ed name, sequence number and line number may be utilized together as the key into the election dictionary. In addition, a long string matching algorithm may be utilized to provide error detection to the string. In one embodiment, the Levenshtein distance algorithm may be utilized for such string error detection. More specifically, the Levenshtein technique is used for error detection and the calculation of a "distance" between the OCR data and each key in the dictionary. If a calculated distance is below a defined threshold, then the data is matched to that dictionary entry. Then as described below, a hash check indicates if all of the matches were correct. In this manner, OCR data errors may be eliminated leading to a more robust OCR result which may be used for the subsequent generation of a cast vote record.

[0008] Further, to ensure the PVR is valid and/or has not been altered after printing, a barcode is also provided on the PVR. The barcode includes a single digitally signed hash that may be generated by using a secure hash function to indicate the PVR is valid and a one way hash of the voter's vote selections. As part of the scanning process, the optical character recognition results may be generated and then verified by use of another hash process. More specifically, a hash produced from the OCR generated characters may be compared to the hash provided in the barcode. Such techniques confirm that the PVR was printed from a known source and that the PVR has not been altered from its original state. In this manner, a counterfeit PVR or a PVR that has had its characters altered may be detected. Moreover, if the PVR was improperly or tampered with when printed this technique may detect such tampering.

[0009] To further ensure the accuracy of the OCR process, additional processing beyond traditional OCR processes may also be utilized for recognizing the characters presented on the PVR.

[0010] In one embodiment, a method for electronic voting using printed vote records is provided. The method comprises recording a voter's vote selections and generating a printed vote record of the voter's vote selections, the printed vote record containing voter readable text indicating the voter's vote selections. The method further comprises scanning the printed vote record, the scanning including scanning the voter readable text. The method also includes utilizing optical character recognition (OCR) on the scanned voter readable text to create a data set which identifies the voter's vote selections and generating a cast vote record from the data set so that voter selections in the cast vote record are based on the voter readable text.

[0011] In another embodiment, a method for electronic voting using printed vote records is provided. The method may comprise recording a voter's vote selection with a ballot marking device and generating a printed vote record of the voter's vote selections, the printed vote record containing voter readable text including a candidate name of a voter's vote selection. The method further comprises electronically scanning the printed vote record, the scanning including scanning the candidate name. The method also includes utilizing optical character recognition (OCR) on the scanned candidate name to create a first data set. The method further comprises comparing the first data set with an election dictionary and generating a cast vote record based on the comparing of the first data set with the election dictionary so that voter selections in the cast vote record are based on is based at least in part on the scanned candidate name.

[0012] In yet another embodiment, a method for electronic voting using printed vote records is provided. The method comprises recording a voter's vote selections and generating a printed vote record of the voter's vote selections, the printed vote record containing voter readable text indicating the voter's vote selections, the printed vote record further including a bar code. The method further comprises electronically scanning the printed vote record, the electronical scanning including scanning the voter readable text and scanning the bar code. The method also includes utilizing optical

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character recognition (OCR) on the scanned voter readable text to create a data set which identifies the voter's vote selections and generating a cast vote record from the data set so that voter selections in the cast vote record are based on the voter readable text.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] A more complete understanding of the present invention and advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features. It is to be noted, however, that the accompanying drawings illustrate only exemplary embodiments of the disclosed concept and are therefore not to be considered limiting of its scope, for the disclosed concept may admit to other equally effective embodiments.

[0014] Figure 1 illustrates an exemplary voting system for utilizing the techniques described herein.

[0015] Figure 2 illustrates an exemplary ballot marking device for utilizing the techniques described herein.

[0016] Figure 3 illustrates an exemplary printed vote record generated by the ballot marking device.

[0017] Figure 4 illustrates an exemplary printed vote record process flow utilizing the techniques described herein.

[0018] Figure 5 illustrates an exemplary process flow for matching OCR data to ballot choices.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] Figure 1 illustrates one exemplary embodiment of a voting system for utilizing the techniques described herein. It will be recognized, however, that the techniques

described herein may be utilized in a wide range of other voting systems. As shown in Figure 1, a voting system 10 that may be located at a polling location includes a ballot marking device (BMD) 15, a scanner 20 and a computing device 25. In one embodiment of a voting process, a polling official and/or the voter may activate a voting session on the BMD 15 (in one example by providing an access code to a voter to access the BMD 15). After activation, the voter may then make voting selections on the BMD 15. When the voter has completed their selections, the BMD 15 may then print out a PVR of the voter's voting selections. As described above and explained in more detail below, the voter's selections may be indicated on the PVR using readable characters so that the voter may visually confirm their voting selections, thus providing voting transparency to the voter. The voter may then enter the PVR into a scanner 20 which provides a scanned image of the PVR. The scanner 20 may provide that scanned image of the PVR to a computing device 25 which is connected to the scanner 25. The computing device may then perform an OCR process on the scanned image. The computing device 25 may also provide improved accuracy and/or error correction of the OCR by utilizing data processing techniques that are described herein to enhance the conversion of the scanned image to usable data. The scanning hardware for the scanner 20 may be conventional scanning hardware. However, as described in more detail below, specialized data analysis of the scanned information may be provided to improve the integrity and reliability of the scan. Such data analysis may be accomplished with the computing device 25. The computing device may then generate an electronic cast vote record associated with the voter's selections. It will be recognized that the functionality of the computing device may alternatively be integrated within the scanner 20. The BMD 15, scanner 20 and computing device 25 may each be separate non-integrated devices. Alternatively, all or some of the functionality of these devices may be integrated together within one device.

[0020] Figure 2 illustrates an exemplary BMD. However, it will be recognized that a wide range of other BMDs may be utilized while still achieving the advantages of the voting process described herein. The BMD 100 of Figure 2 includes a display 105, a voting processing unit 110 and a printer medium input tray 115. The voting processing unit 110 may include a variety of hardware and software, including a memory, processors,

associated election software, input devices, etc., all as is known in the art. In operation, a voter may utilize the BMD 100 as part of the process of casting a vote in an election. The voter may be provided instructions and voting choices that are presented on the display 105 of the BMD 100. Various voter responses and election selections may be entered via the display (in the case of a touchscreen display) or may entered via other inputs such as a keypad, buttons, dials, etc. that may be part of the voting processing unit 110. The BMD 100 also includes an internal printer (not shown). The printer may be utilized to print a voter's selections on a PVR. In one embodiment, the printer may be a thermal printer and the PVR may be printed on thermal paper. In operation, a voter uses the BMD 100 to generate a PVR. The PVR may then be scanned and processed as described elsewhere herein to create an electronic cast vote record. As described herein, the PVR may be utilized not only as part of the cast vote record generation process, but also as a tool for the voter to inspect the generated vote selections prior to casting the voter selections through the scanning process.

[0021] As described herein, the BMD may be a hybrid voting device that combines electronic voting features with the production of a PVR. Such a technique allows voting transparency to the voter and provides the election officials a paper record which may be used for audit or other purposes. The PVR may be a full sheet of standard paper stock or may be other customized sizes. As described herein, OCR may be used to determine the voter selections with the add-on of additional data process techniques to ensure data accuracy of the OCR process and ensure validity of the PVR.

[0022] As mentioned, OCR techniques may be utilized to scan the PVR to record the voter's selections. The OCR data is then utilized to generate the cast vote record. Thus, the electronic voting system directly interprets the voter selections from the PVR just as the voter sees the data. In this manner "what you see is what you get" printed vote record data is provided for a voter's viewing and that same data is used to generate the cast vote record.

[0023] Further, the OCR process utilized accounts for and corrects for potential OCR errors. In one embodiment, an election dictionary is provided of the potential vote choices. Thus, for example, candidate names may be entered into the election

dictionary and utilized for pattern matching to the OCR results. To further, ensure accuracy (and address candidates that have the same or similar names) additional information beyond just the candidate name be utilized for comparison to the election dictionary. Thus, in one embodiment, the OCR'ed name and additional data may be utilized together as the key into the election dictionary. The additional data may be data related to a candidate, but being more than just the candidate name. For example, in some embodiments, the additional data may be the sequence number data affiliated with a candidate. The additional data may also be line number data affiliated with a contest, and/or the contest name itself. Thus, for example, the OCR'ed name and sequence number, the OCR'ed name and line number, or the OCR'ed name, sequence number and line number may be utilized together as the key into the election dictionary. It will be recognized that other combinations of a candidate name and additional data may also be used.

[0024] In addition a long string matching algorithm may be utilized to provide error detection to the string. In one embodiment, the Levenshtein distance algorithm may be utilized for such string error detection. More specifically, the Levenshtein algorithm is used for error detection and the calculation of a "distance" between the OCR data and each key in the dictionary. If a calculated distance is below a defined threshold, then the data is matched to that dictionary entry. Then as described below, a hash check indicates if all of the matches were correct. In this manner, OCR data errors may be minimized and a more robust OCR result may be obtained and used for the subsequent generation of a cast vote record.

[0025] The scanned data for write-in candidates may be treated somewhat differently as the names of write-in candidates may not be available before the voting process for entry in an election dictionary to use in the OCR post-processing steps as described above. In one embodiment, write-in data may be saved in two parts as part of the cast vote record. First, a PNG snippet of the entered write-in data (a photo "snapshot") may be stored as part of the cast vote record. Second, the OCR digital results of the write-in data are also stored. Both parts may then be included in the cast vote record and uploaded for tabulation. When the election office processes write-in votes, the election office will have the digital OCR data side by side with the write-in image so that manual

adjudication (if desired) may be accomplished. In one embodiment, further additional back office write-in candidate data verification may be accomplished if the election office generates a certified write-in candidate list. More particularly, the names from the certified write-in candidate list may be entered into the back office post-processing computer systems and then used in the same manner that the election dictionary described above is used to provide enhanced accuracy to the OCR results for write-in candidates.

[0026] Further, to ensure the PVR is valid and/or has not been altered after printing, a barcode is also provided on the PVR. The barcode includes a single digitally signed hash that may be generated using a secure hash function to indicate the PVR is valid and a one way hash of the voter's vote selections. As part of the scanning process, the optical character recognition results may be generated and then verified by use of another hash process. More specifically, a hash produced from the OCR generated characters may be compared to the hash provided in the barcode. Such techniques confirm that the PVR was printed from a known source and that the PVR has not been altered from its original state. In this manner, a counterfeit PVR or a PVR that has had its characters altered may be detected. Moreover, if the PVR was improperly or tampered with when printed, this technique can detect such tampering. It is noted that the barcode is used to confirm data accuracy and PVR integrity but, in one embodiment does not have to be used to determine voter selections. The barcode could be any of a wide range of barcode types, including for example, one dimensional barcodes or a matrix two-dimensional barcode (such as for example a QR code). Further, though described as one barcode, it will be recognized that the barcode may be split across multiple barcodes as well. For example, each barcode could serve as a landmark and the found barcode positions could be used to correct for scanning skew.

[0027] An exemplary PVR provided by the BMD 100 of Figure 2 is shown in Figure 3. As shown in Figure 3, a PVR 300 is provided. The PVR may include a header region 310 in which a variety of information may be printed. In one example, the header region 310 may include instructions to the voter, information regarding the election, a PVR number, page information, etc. As shown, in one embodiment a barcode 320 may be provided in the header region. In the example shown, the barcode is in the form of a QR code;

however, other barcodes may be utilized. As described above, the barcode may be used to confirm data accuracy and/or PVR integrity but, in the exemplary embodiment, is not used to determine voter selections. The election voting contests may be shown in the contest section 330 of the PVR 300 as shown. Further, the voter's selections may be shown in the voter selection section 340 of the PVR 300 as shown. As seen in Figure 3, the voter selections are provided in a character form that is readable by the voter. Thus, voting transparency is provided to the voter such that the voter can confirm the PVR matches the selections entered by the voter on the BMD 100.

[0028] The contents of the barcode 320 may contain a wide variety of information including metadata content and hash data content. In one exemplary embodiment, the metadata content may include, but is not limited to a PVR barcode version, an election ID number, other unique ID numbers, an election version, precinct split sequence number, party sequence number, a crossover ballot flag, provisional ballot flag, official versus test ballot flag, accessibility settings, sheet number, sequence number of the first contest on the sheet, the number of lines on the sheet, etc. One use of the hash content is to ensure all voter selections were read correctly. Another use of the hash content is to verify the validity of the PVR itself. The hash may cover, in one embodiment, ballot metadata sections and all printed data in the voter selection section 340.

[0029] Thus, the barcode uses a single digitally signed hash that can be used for multiple purposes. First, the single digitally signed hash may be used to ensure the source origin of the PVR (that it came from the BMD 100), since it is a digital signature. In addition, the one way hash of voter selections provided in the barcode can be used to for a comparison to a hash of the OCR voter selections. The comparison of the one way hash of the barcode to the hash of OCR results can confirm that the PVR was not edited after printing. For example, if a voter's selection was edited on the PVR after printing from a first candidate name to a second candidate name, the OCR process would decode the second candidate name, but when hash checked, the first candidate name would have been utilized to create the barcode hash, and thus the hash check would fail. In this manner, though the barcode contains a hash of the voter selection data, the barcode does not contain the original voter selection data itself.

[0030] Figure 4 illustrates one exemplary PVR processing workflow utilizing a PVR such as PVR 300 of Figure 3. It will be recognized that the workflow of Figure 4 is merely one exemplary workflow and many other workflows may utilize the techniques disclosed herein. As shown in the workflow of Figure 4, a scanned PVR is analyzed in accordance with the flow diagram of the workflow starting with a PVR scan and ending with either a rejected ballot or a cast or review of the ballot. As shown in Figure 4, the workflow starts with step 400 of starting a PVR scan. Next, at step 405 the barcode is decrypted and at step 405 it is determined if the decrypt succeeded. It the decryption was successful the workflow proceeds to step 415. If the decryption was not successful the workflow proceeds to step 420 where the workflow ends and the PVR is rejected. At step 515, the PVR is analyzed to determine if it is allowed. If the PVR is allowed the workflow proceeds to step 425 and if the PVR is not allowed, the workflow proceeds to step 420 where the workflow ends and the PVR is rejected. At step 425, the PVR is subjected to an OCR process. At step 430, the output of the OCR is analyzed to confirm it has a valid output (for example the correct number of lines, etc.). If no, the workflow proceeds to step 420 where the PVR is rejected. If yes, the workflow proceeds to step 435.

[0031] At step 435 the OCR data is matched to the ballot choices. Then at step 440 the hash is checked and if the hash matches at step 450 the workflow proceeds to step 460. If the hash does not match the process proceeds to step 455 where it is determined if there are still valid alternatives to try. If there are no valid alternatives to try, the workflow proceeds from step 455 to step 420 where the PVR is rejected. If there are valid alternatives to try at step 455, the workflow proceeds to step 440 it is determined if the number of contests with an alternate is under a threshold. If the answer is no at step 440, workflow to step 420 where the PVR is rejected. If the answer is yes at step 440, workflow proceeds to step 445 where alternates are swapped in. Workflow then proceeds again to step 440 and steps 440 and 450 are performed again as described above. At step 460, all write-in areas are snipped. From step 460, the process proceeds to step 465 to add OCR text to snippets and then the process ends at step 470 where the PVR is cast or reviewed.

[0032] It is noted that, as part of the workflow of Figure 4, a process step occurs that matches the OCR data to ballot choices, for example at step 435 of Figure 4. Details

regarding this process step are shown in more detail in Figure 5. It will be recognized that the workflow of Figure 5 is merely one exemplary matching workflow and many other workflows may utilize the techniques disclosed herein. As shown in Figure 5, a process is shown for ballot choice matching for each OCR entry. As shown in step 500, the workflow of Figure 5 beings with an OCR entry. At step 505, the workflow concatenates the choice name and additional data (in this example a sequence number) and the value for each possible ballot choice to create comparison strings. Note, this may include "no selection" strings to account for the situation where no selection is made by the voter. Then at step 510, the process finds the comparison string with the lowest Levenshtein distance to the OCR string. Next at step 515, it is determined if the Levenshtein distance is under a threshold. If yes, the process proceeds to step 525. If no, the process proceeds to step 520 and the printed vote record is rejected. At step 525 it is determined if any other chances have the same distance. If no, the process proceeds to step 535. If yes, the process proceeds to step 530. At step 535 the choice provided is used and the process proceeds as shown in Figure 4 and described above. At step 530, the other choices are added to the valid alternatives list and the process then proceeds to step 535.

[0033] Thus, as described herein, a PVR is provided that is readable by a voter. Further, the readable text is utilized to generate an electronic cast vote. By being readable, full voter verification of a voter's vote selections is provided in a format that provides transparency to the voting process. An OCR process is performed on the PVR and the output of the OCR process is further processed in order to ensure data integrity and reliability. In one embodiment, an election dictionary is provided of the potential vote choices and the election dictionary and other data on the PVR is utilized to provide reliable matching of the OCR results with the proper ballot choice. A barcode and hash process may further be utilized to ensure PVR integrity and security. Thus, a voter's choices are shown in text and OCR techniques are utilized while a barcode is utilized for PVR and choice verification. In this manner, a secure, reliable and transparent voting workflow is provided.

[0034] Further modifications and alternative embodiments of this invention will be apparent to those skilled in the art in view of this description. Accordingly, this

description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the manner of carrying out the invention. It is to be understood that the forms and methods of the invention herein shown and described are to be taken as presently preferred embodiments. Equivalent techniques may be substituted for those illustrated and described herein and certain features of the invention may be utilized independently of the use of other features, all as would be apparent to one skilled in the art after having the benefit of this description of the invention.

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What is claimed is:

1. A method for electronic voting using printed vote records, comprising:

generating a printed vote record of at least one vote selection of a voter;

providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection;

electronically capturing information from the printed vote record;

using optical character recognition (OCR) on at least a portion of the electronically captured information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's at least one vote selection;

comparing the first data set to a second data set; and

generating a cast vote record indicating the voter's at least one vote selection, wherein, prior to generating the cast vote record, an accuracy of data to be cast is confirmed based at least in part on a comparison of the first data set and the second data set.

2. The method of claim 1, wherein the second data set comprises an election dictionary.

3. The method of claim 1, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection, and wherein the second data set is generated at least in part from the encoded data.

4. The method of claim 3, wherein electronically capturing information from the printed vote record includes capturing the encoded data.

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5. The method of claim 3, further comprising using an election dictionary to assist in confirming an accuracy of the first data set.

6. The method of claim 1, wherein the electronically capturing information from the printed vote record comprises electronically scanning the voter readable text.

7. The method of claim 6, wherein the printed vote record further comprises encoded data based at least in part on the voter's at least one vote selection, and wherein the electronically capturing information from the printed vote record further comprises electronically scanning the encoded data.

8. The method of claim 7, wherein the encoded data is contained in a visual representation of encoded data."

9. The method of claim 8, wherein the visual representation of encoded data is a bar code.

10. The method of claim 9, wherein the bar code is a one-dimensional bar code.

11. The method of claim 9, wherein the bar code is a two-dimensional bar code.

12. The method of claim 11, wherein the two-dimensional bar code is a QR code

13. The method of claim 1, wherein the information captured from the printed voter record comprises the voter readable text indicating the voter's at least one vote selection and other information.

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14. The method of claim 13, wherein the other information is contained in a bar code.

15. The method of claim 13, wherein the second data set is based at least in part on the other information.

16. The method of claim 1, wherein electronically capturing information from the printed vote record comprises capturing an image of the printed vote record.

17. A method for electronic voting using printed vote records, comprising:

generating a printed vote record of at least one vote selection of a voter;

providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection;

electronically capturing first information from the printed vote record;

using optical character recognition (OCR) on the first information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's at least one vote selection;

electronically capturing second information from the printed vote record, to generate a second data set, the second information comprising encoded data;

comparing the first data set to a second data set; and

generating a cast vote record indicating the voter's at least one vote selection, wherein, prior to generating the cast vote record, an accuracy of data to be cast is confirmed based at least in part on a comparison of the first data set and the second data set.

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18. The method of claim 17, further comprising using an election dictionary to assist in confirming the accuracy of the data to be cast.

19. The method of claim 17, wherein the encoded data is contained in a visual representation of encoded data.

20. The method of claim 19, wherein the visual representation of encoded data is a bar code.

21. The method of claim 17, further comprising confirming an accuracy of an optical character recognition (OCR) by utilizing a first hash produced from the first data set.

22. The method of claim 17, further comprising confirming an accuracy of an optical character recognition (OCR) by comparing a first hash produced from the first data set to a second hash, wherein the second hash is at least part of the encoded data.

23. The method of claim 17, wherein the comparison of the first data set and the second data set is used to confirm an accuracy of an optical character recognition (OCR) process by confirming that the at least one vote selection that the first data set is based at least in part on matches the at least one vote selection that the second data set is based at least in part on.

24. The method of claim 17, wherein the cast vote record is based on the first data set.

25. The method of claim 17, wherein using optical character recognition (OCR) on the first information to generate a first data set further comprises recursively modifying an OCR process applied to the voter readable text.

26. The method of claim 17, wherein the cast vote record is configured to be tabulated with other records to indicate the outcome of an election.

27. The method of claim 26, wherein after the cast vote record is generated, the cast vote record is utilized during a tabulation of an election.

28. An electronic voting system for using printed vote records, comprising:

a printer configured to generate a printed vote record of at least one vote selection of a voter, the printed vote record including voter readable text indicating the voter's at least one vote selection;

a scanner configured to electronically capture first information from the printed vote record, the first information including the voter readable text; and

a processor configured to use optical character recognition (OCR) on the first information to generate a first data set based at least in part on the voter readable text indicating the voter's at least one vote selection,

wherein the processor is configured to recursively modify the first data set, and

wherein the processor is further configured to provide a cast vote record indicating the voter's at least one vote selection based on the first data set.

29. The system of claim 28,

wherein the scanner is further configured to electronically capture second information from the printed vote record, to generate a second data set, the second information comprising encoded data, and

wherein the processor is further configured to generate an OCR hash from the first data set, and to compare the OCR hash to an encoded hash extracted from the encoded data on the printed vote record.

30. The system of claim 29, wherein the processor is configured to recursively modify the first data set by generating an additional OCR hash for comparison to the encoded hash until the additional OCR hash matches the encoded hash.

31. The system of claim 29, wherein the processor is configured to recursively modify the first data set by, in response to a mismatch between the OCR hash and the encoded hash, selecting a valid alternate OCR output.

32. The system of claim 28, wherein the processor is configured to recursively modify the first data set by generating an OCR string from the voter readable text, and comparing the OCR string to at least one comparison string.

33. The system of claim 32, wherein the comparison string comprises data from an election dictionary including at least a part of a candidate's name and additional data.

34. The system of claim 28, wherein the processor is configured to recursively modify the first data set by:

generating an OCR string from the voter readable text; and

calculating a distance between the OCR string and at least one comparison string.

35. The system of claim 34, wherein the distance is a Levenshtein distance.

36. The system of claim 34, wherein the processor is further configured to recursively modify the first data set by identifying an alternative comparison string having distance below a defined threshold.

37. The system of claim 36, wherein the distance is a Levenshtein distance.

38. The system of 28,

wherein the scanner is further configured to electronically capture second information from the printed vote record, to generate a second data set, the second information comprising encoded data, and

wherein the processor is further configured to confirm, prior to generating the cast vote record, an accuracy of data to be cast based at least in part on a comparison of the first data set and the second data set.

39. A method for electronic voting using printed vote records, comprising:

generating a printed vote record of at least one vote selection of a voter;

providing, on the printed vote record, voter readable text indicating the voter's at least one vote selection;

electronically capturing first information from the printed vote record;

using optical character recognition (OCR) on the first information to generate a first data set, the first data set based at least in part on the voter readable text indicating the voter's at least one vote selection;

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electronically capturing second information from the printed vote record, to generate a second data set, the second information comprising encoded data;

comparing the first data set to a second data set;

confirming an accuracy of the at least one vote selection of the voter based at least in part on a comparison of the first data set and the second data set; and

after confirming an accuracy of the at least one vote selection, generating a cast vote record indicating the voter's at least one vote selection as determined by the first data set;

wherein the cast vote record is configured to be utilized for tabulating of an election.

40. The method of claim 39, further comprising using an election dictionary to assist in confirming an accuracy of the first data set.

41. The method of claim 39, wherein comparing the first data set to the second data set comprises comparing a first hash produced from the first data set to a second hash extracted from the encoded data on the printed vote record.

42. The method of claim 39, further comprising recursively modifying the first data set, prior to generating the cast vote record.

43. The method of claim 42, wherein the recursively modifying the first data set comprises generating an additional OCR hash for comparison to a second hash extracted from the encoded data on the printed vote record, until the additional OCR hash matches the second hash.

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44. The method of claim 42, wherein recursively modifying the first data set further comprises: based on the comparison of the first data set to the second data set, selecting a valid alternate OCR output based on the OCR process applied to the voter readable text.

45. The method of claim 42, wherein recursively modifying the first data set further comprises generating an OCR string from the voter readable text, and comparing the OCR string to at least one comparison string.

46. The method of claim 45, wherein the comparison string comprises data from an election dictionary including at least a part of a candidate's name and additional data.

47. The method of claim 39, wherein generating the first data set further comprises:

generating an OCR string from the voter readable text; and

calculating a distance between the OCR string and at least one comparison string.

48. The method of claim 47, wherein the distance is a Levenshtein distance.

49. The method of claim 47, wherein generating the first data set further comprises identifying an alternative comparison string having distance below a defined threshold.

50. The method of claim 49, wherein the distance is a Levenshtein distance.

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51. The method of claim 39, further comprising: utilizing the cast vote record in tabulating the results of an election.

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ABSTRACT

An electronic voting system is described that utilizes printed vote records (PVRs) in which a voter's vote selections are recorded in voter readable characters. Optical character recognition (OCR) techniques may then be utilized to scan the PVR to record the voter's selections. The OCR data is then utilized to generate the cast vote record. Thus, the electronic voting system directly interprets the voter selections from the PVR just as the voter sees the data. In this manner "what you see is what you get" printed vote record data is provided for a voter's viewing and that same data is used to generate the cast vote record.

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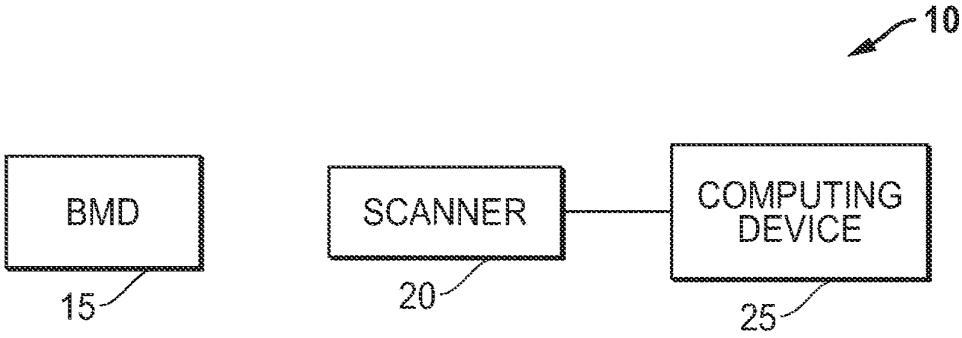

FIG. 1

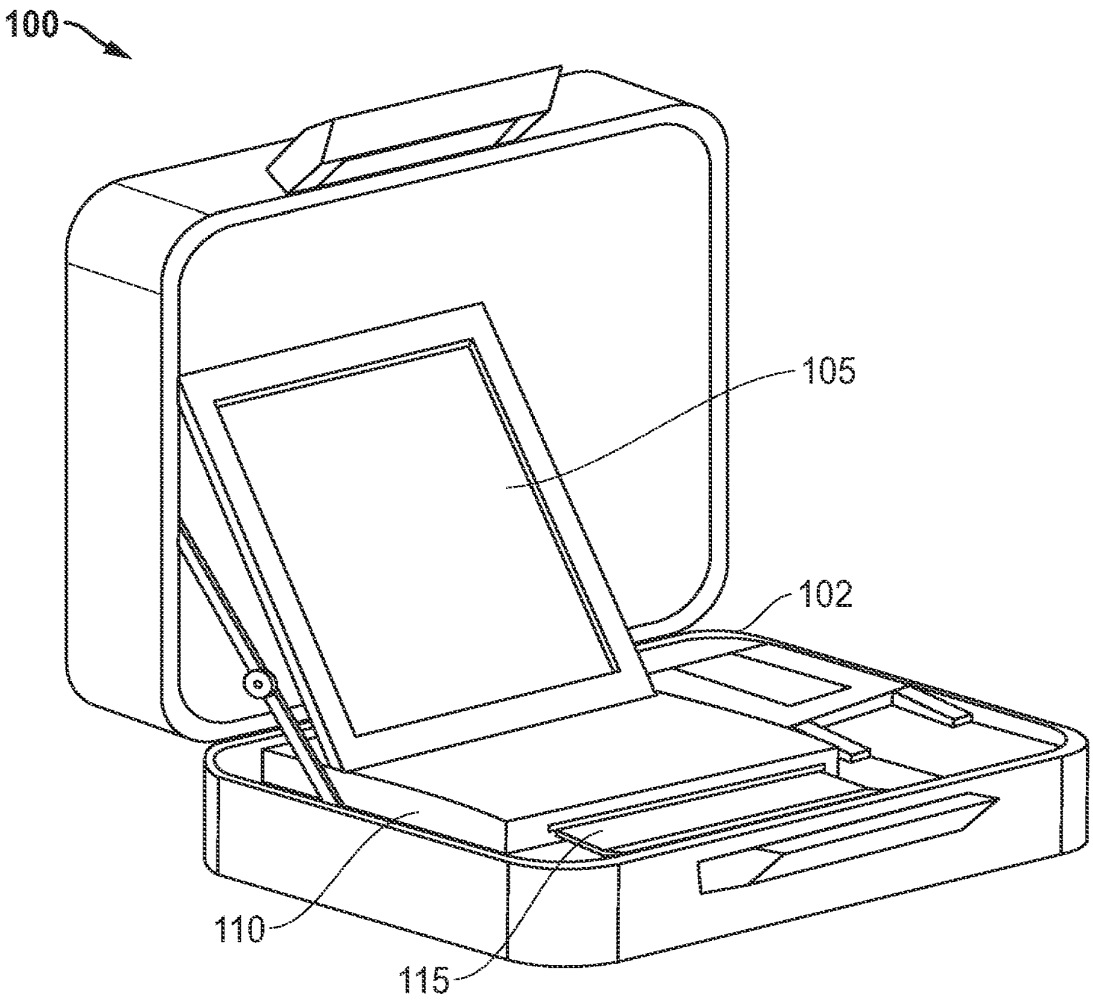

FIG. 2

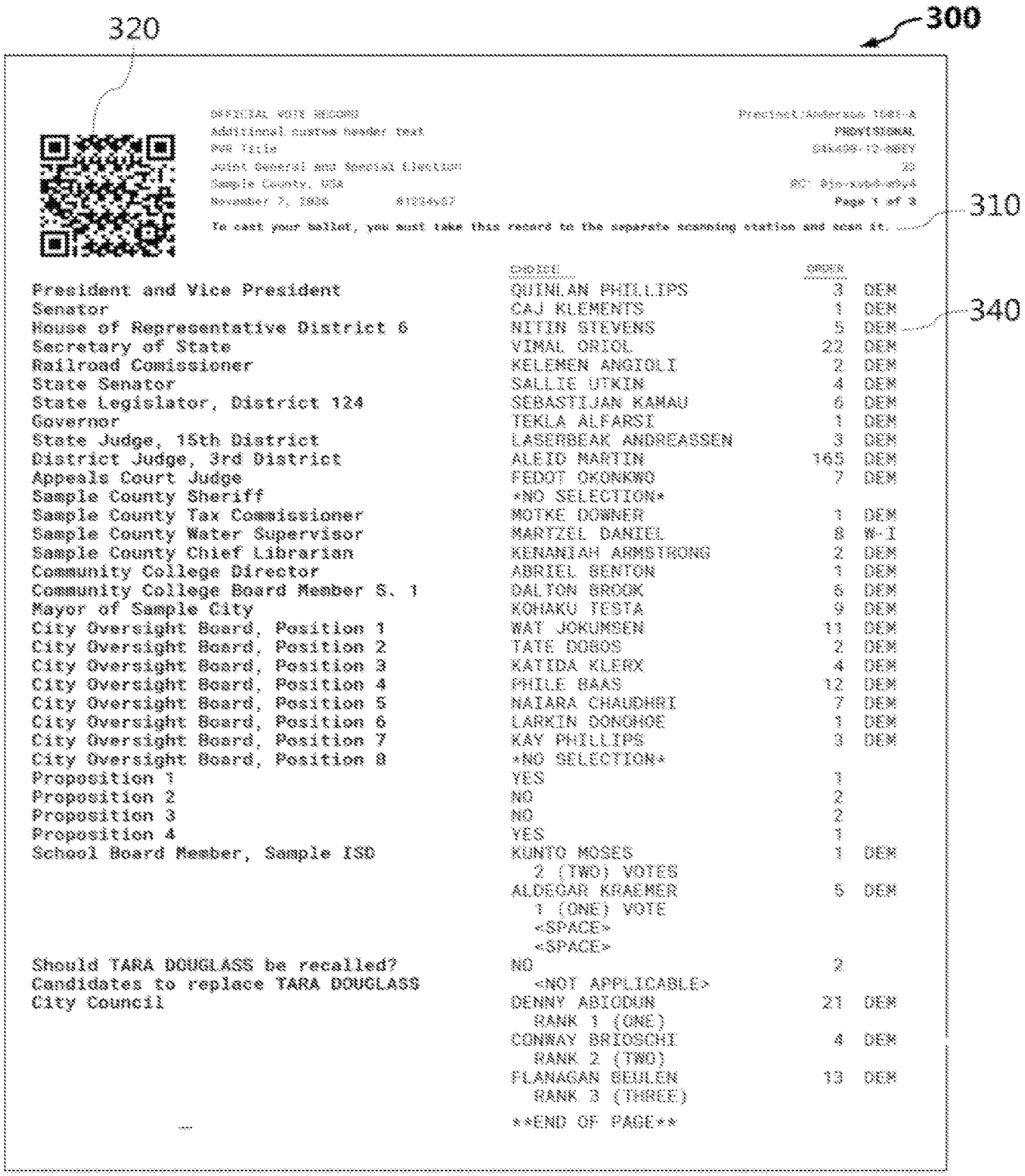
320
300
OFFICIAL VOTE RECORD
Additional custom header text
PCR Title
Joint General and Special Election
Sample County, USA
November 7, 2006
Precinct/Anderson 1561-A
PROVISIONAL
Page 1 of 3
To cast your ballot, you must take this record to the separate scanning station and scan it.
310
CHOICE
VOTES
Presidential and Vice President
QUINLAN PHILLIPS 3 DEM
Senator
CAJ KLEMENTS 1 DEM
House of Representative District 6
NITIN STEVENS 5 DEM
340
Secretary of State
VIMAL ORIOL 22 DEM
Railroad Comissioner
KELEMEN ANGIOLI 2 DEM
State Senator
SALLIE UTKIN 4 DEM
State Legislator, District 124
SEBASTIJAN KAMAU 6 DEM
Governor
TEKLA ALFARSI 1 DEM
State Judge, 15th District
LASERBEAK ANDREASSEN 3 DEM
District Judge, 3rd District
ALEID MARTIN 165 DEM
Appeals Court Judge
FEDOT OKONKWO 7 DEM
Sample County Sheriff
NO SELECTION
Sample County Tax Commissioner
MOTKE DOWNER 1 DEM
Sample County Water Supervisor
MARTZEL DANIEL 8 W-I
Sample County Chief Librarian
KENANIAH ARMSTRONG 2 DEM
Community College Director
ABRIEL SENTON 1 DEM
Community College Board Member S. 1
DALTON BROOK 6 DEM
Mayor of Sample City
KOHAKU TESTA 9 DEM
City Oversight Board, Position 1
WAT JOKUMSEN 11 DEM
City Oversight Board, Position 2
TATE DOBOS 2 DEM
City Oversight Board, Position 3
KATIDA KLERX 4 DEM
City Oversight Board, Position 4
PHILE BAAS 12 DEM
City Oversight Board, Position 5
NAIARA CHAUDHRI 7 DEM
City Oversight Board, Position 6
LARKIN DONOHOE 1 DEM
City Oversight Board, Position 7
KAY PHILLIPS 3 DEM
City Oversight Board, Position 8
NO SELECTION
Proposition 1
YES 1
Proposition 2
NO 2
Proposition 3
NO 2
Proposition 4
YES 1
School Board Member, Sample ISD
KUNTO MOSES 1 DEM
2 (TWO) VOTES
ALDEGAR KRAEMER 5 DEM
1 (ONE) VOTE
<SPACE>
<SPACE>
Should TARA DOUGLASS be recalled?
NO 2
Candidates to replace TARA DOUGLASS
<NOT APPLICABLE>
City Council
DENNY ABIODUN 21 DEM
RANK 1 (ONE)
CONWAY BRIOSCHI 4 DEM
RANK 2 (TWO)
FLANAGAN BEULEN 13 DEM
RANK 3 (THREE)
END OF PAGE

FIG. 3

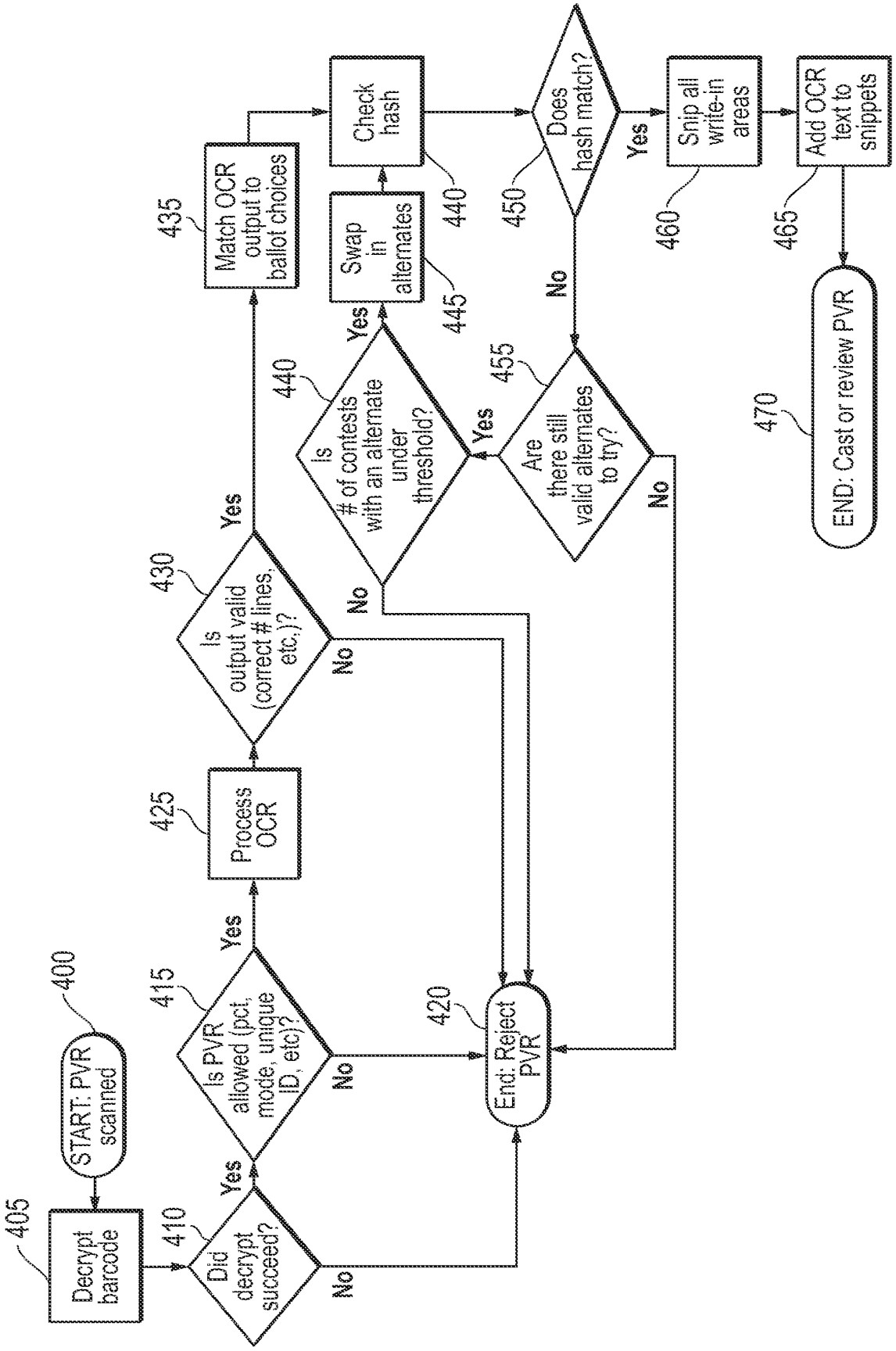
START: PVR scanned
400
Decrypt barcode
405
Did decrypt succeed?
410
Is PVR allowed (pct, mode, unique ID, etc)?
415
Process OCR
425
Is output valid (correct # lines, etc.)?
430
Match OCR output to ballot choices
435
Is # of contests with an alternate under threshold?
440
Swap in alternates
445
Are there still valid alternates to try?
455
Check hash
440
Does hash match?
450
Snip all write-in areas
460
Add OCR text to snippets
465
END: Cast or review PVR
470
End: Reject PVR
420
Yes
No

FIG. 4

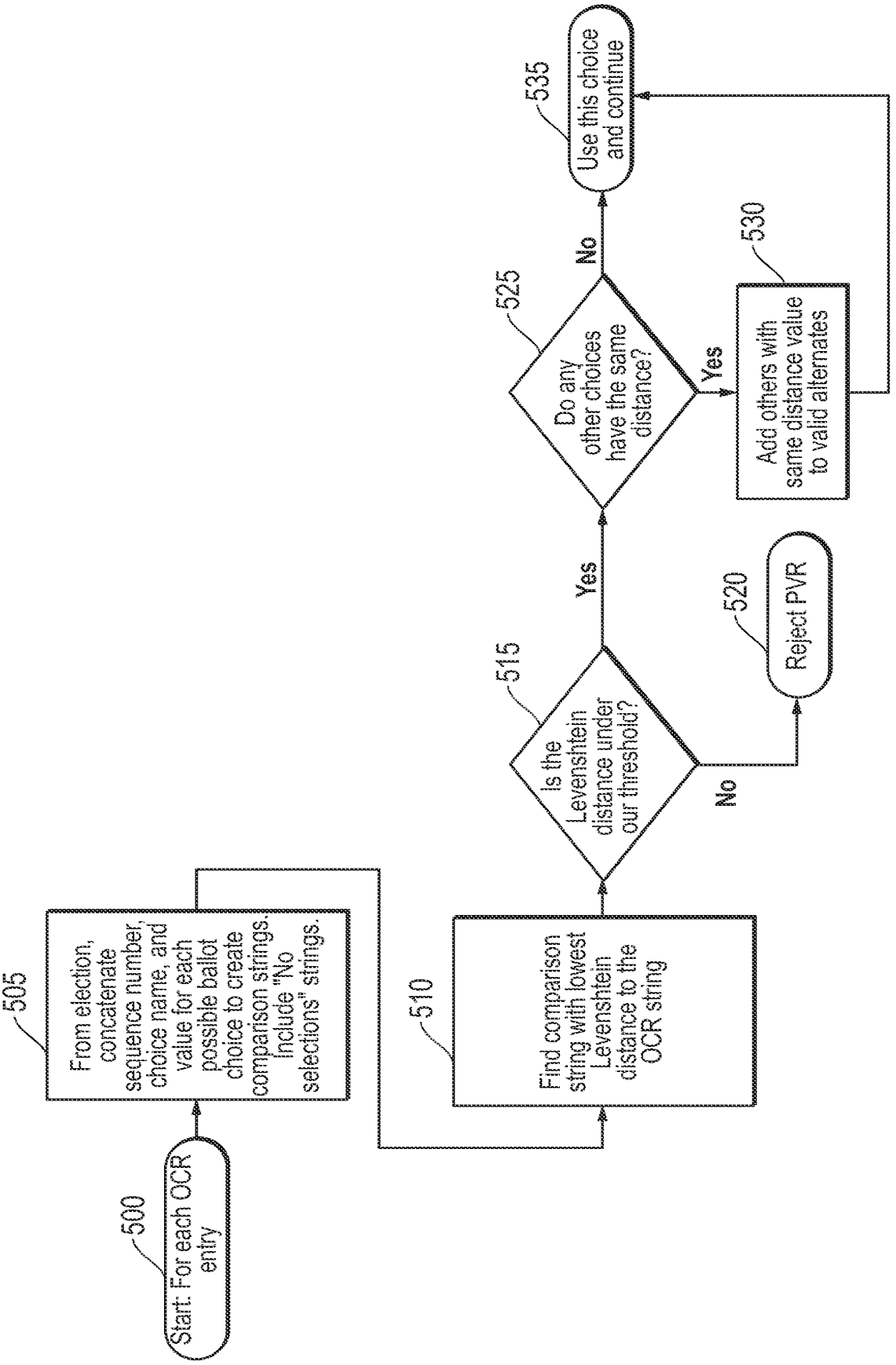
500
Start: For each OCR entry
505
From election, concatenate sequence number, choice name, and value for each possible ballot choice to create comparison strings. Include "No selections" strings.
510
Find comparison string with lowest Levenshtein distance to the OCR string
515
Is the Levenshtein distance under our threshold?
No
520
Reject PVR
Yes
525
Do any other choices have the same distance?
Yes
530
Add others with same distance value to valid alternates
No
535
Use this choice and continue

FIG. 5