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Tra. 2 PATENTILS Eje: 1 REGDEPOSITO  
Act. 538 PETICION Folios: 2

181  
183

Señores

**DIVISIÓN DE NUEVAS CREACION****SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO**

E. S. D.

|             |                      |                                                       |
|-------------|----------------------|-------------------------------------------------------|
| Referencia: | Tipo de Trámite:     | <b>REGISTRO DE PATENTE DE INVENCION</b>               |
|             | Número de Solicitud: | <b>06.065916</b>                                      |
|             | Título:              | <b>BOLETA ELECTRONICA<br/>DISPOSITIVO DE VOTACION</b> |
|             | Solicitante:         | <b>SMARTMATIC INTERNATIONAL<br/>CORPORATION</b>       |
|             | Asunto:              | Solicitud de Examen de Patentabilidad                 |
|             | Int Cl.:             | G07C 13/00                                            |

**ENRIQUE ARANGUREN LAURENS**, mayor de edad, domiciliado en la ciudad de Bogotá D.C., identificado con la Cédula de Ciudadanía Número 80.410.504 de Usaquén, Abogado con Tarjeta Profesional Número 71.254 del Consejo Superior de la Judicatura, actuando en mi calidad de apoderado de la sociedad **SMARTMATIC INTERNATIONAL CORPORATION**, sociedad legalmente constituida y domiciliada en la ciudad de Port. St. Charles, Heywoods, St. Peter, Barbados, me permito solicitar dentro del término concedido, y de acuerdo con lo establecido en el Artículo 44 de la Decisión 486 de la Comisión de la Comunidad Andina y la Resolución 36155 del 28 de Diciembre del 2006 por medio de la cual se fijan las tasas de propiedad industrial, el examen de patentabilidad correspondiente a la solicitud de la referencia.

Para el efecto anexo **RECIBO OFICIAL DE CAJA NÚMERO 07-85,664** por valor de **CUATROCIENTOS CUATRO MIL PESOS M/cte. (\$404.000.00)** por concepto de **EXAMEN DE PATENTABILIDAD DE INVENCION**.

Es importante establecer que la solicitud de patente de invención fue publicada en la Gaceta de la Propiedad Industrial Número 578 de Julio 31 del 2.007, Número de Publicación 159, por lo que la presente solicitud se hace dentro del término legal previsto.

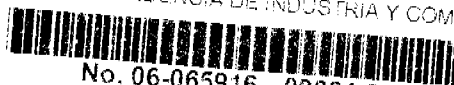
Cualquier información adicional o notificación en relación con la presente comunicación, las recibiré en la Secretaría de su Despacho o en las oficinas ubicadas en la Carrera 13 Número 93-19 Oficina 202 de Bogotá D.C., Teléfono 6350031, Fax 6230844.

Cordialmente.

**ENRIQUE ARANGUREN LAURENS**Cédula de Ciudadanía Número **80.410.504** de UsaquénTarjeta Profesional Número **71.254**Apoderado **SMARTMATIC INTERNATIONAL CORPORATION**

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-065916- -00004-0000

Fecha: 2007-10-19 15:41:38 Dep. 2020 NULCRLACIONE  
Tra. 2 PATENTLS Evt. 1 REGDEPOSITO  
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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 07 - 85,664  
FECHA : OCTUBRE 18 DE 2007

\*\*\*\*\* CONSIGNACION \*\*\*\*\*

| DEPOSITANTE  | TIPO PAGO    | BANCO         | CUENTA      | No. PAGO | FECHA PGO  | Vr. PAGO     |
|--------------|--------------|---------------|-------------|----------|------------|--------------|
| ALBA CHISAVO | CONSIGNACION | BANCO POPULAR | 050-00110-6 | 66408054 | 18/10/2007 | 2,279,000.00 |

\*\*\*\*\* CONCEPTO \*\*\*\*\*

| CANT. | RENTISTICO  | CONCEPTO                             | TOTAL CONCEPTO |
|-------|-------------|--------------------------------------|----------------|
| 1     | 50005-01-01 | SOLICITUDES                          |                |
|       |             | 85 EXAMEN DE PATENTABILIDAD DE INVEN | 404,000.00     |
|       |             | TOTAL :                              | \$ 404,000.00  |

SON: CUATROCIENTOS CUATRO MIL PESOS

RESPONSABLE : \_\_\_\_\_

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. \_\_\_\_\_





US006688517B1

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(12) **United States Patent**  
**McClure et al.**

(10) **Patent No.:** **US 6,688,517 B1**  
(45) **Date of Patent:** **\*Feb. 10, 2004**

(54) **ELECTRONIC VOTING SYSTEM**

(75) **Inventors:** **Neil McClure**, Lafayette, CO (US);  
**Kermit Lohry**, Boulder, CO (US)

(73) **Assignee:** **Hart InterCivic, Inc.**, Austin, TX (US)

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 183 days.

This patent is subject to a terminal disclaimer.

(21) **Appl. No.:** **09/812,768**

(22) **Filed:** **Mar. 20, 2001**

**Related U.S. Application Data**

(62) Division of application No. 08/953,003, filed on Oct. 16, 1997, now Pat. No. 6,250,548.

(51) **Int. Cl.<sup>7</sup>** ..... **G07C 13/00**

(52) **U.S. Cl.** ..... **235/51; 235/57; 235/386**

(58) **Field of Search** ..... **705/12; 235/51, 235/51 R, 51 B, 50 A, 50, 57, 386**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

|             |         |               |
|-------------|---------|---------------|
| 3,620,587 A | 11/1971 | Ahmann        |
| 3,806,219 A | 4/1974  | Ahmann        |
| 4,015,106 A | 3/1977  | DePhillipo    |
| 4,451,728 A | 5/1984  | McKay et al.  |
| 4,569,564 A | 2/1986  | Ahamann       |
| 4,641,240 A | 2/1987  | Boram         |
| 4,641,241 A | 2/1987  | Boram         |
| 4,712,757 A | 12/1987 | Ahmann        |
| 4,774,665 A | 9/1988  | Webb          |
| 4,854,652 A | 8/1989  | Ahmann        |
| 5,189,288 A | 2/1993  | Anno et al.   |
| 5,278,753 A | 1/1994  | Graft, III    |
| 5,341,477 A | 8/1994  | Pitkin et al. |
| 5,379,212 A | 1/1995  | Sarner et al. |
| 5,758,325 A | 5/1998  | Lohry et al.  |
| 5,875,432 A | 2/1999  | Schr          |
| 5,878,399 A | 3/1999  | Peralto       |

6,250,548 B1 \* 6/2001 McClure et al. .... 235/51  
2001/0042005 A1 \* 11/2001 McClure et al. .... 705/12

**OTHER PUBLICATIONS**

"Newcomer U.S. Voting Machines Invades specialized marketplace" *Boulder County Business Report*, Nov. 1994.

"The Mark 1 Voting System", Firm Brochure (date unknown).

\* cited by examiner

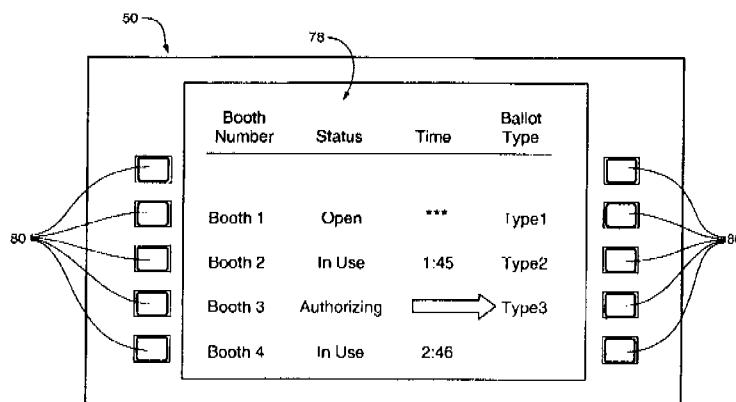
*Primary Examiner*—Karl D. Frech

(74) *Attorney, Agent, or Firm*—Dan Cleveland, Jr.; Lathrop & Gage L.C.

(57) **ABSTRACT**

An electronic voting system with a headquarters unit, a plurality of precinct units, a plurality of voting stations associated with each precinct unit, and a plurality of mobile memory units (MMUs) to contain data that can be transported back and forth between the headquarters unit and the precinct units. The MMUs include FLASH memory, wherein each memory location can be written to once and read many times. Each memory location can thus only be subsequently written to after all the data in the entire FLASH memory has been erased. The system includes the ability to store images of the cast ballots at multiple locations for verification and authentication. The system includes the ability to store a direct representation of the voter's selections as displayed to the voter as a redundant image of the ballot. The system also includes the ability for each voting station to automatically read the particular ballot overlay thereon to verify the proper ballot style is being used. The system also includes the ability to communicate between the various components of the system when the components are in a storage configuration. The various components of the system can be folded from a deployed configuration into the storage configuration so that the largest two-dimensional aspect in the storage configuration is a fraction of that in the deployed configuration. The system also includes a remote sensing terminal and a text-to-speech converter for use by disabled persons. An absentee ballot that can be read by the voting system is also provided as is the ability to vote over a computer network, such as the Internet.

**10 Claims, 29 Drawing Sheets**



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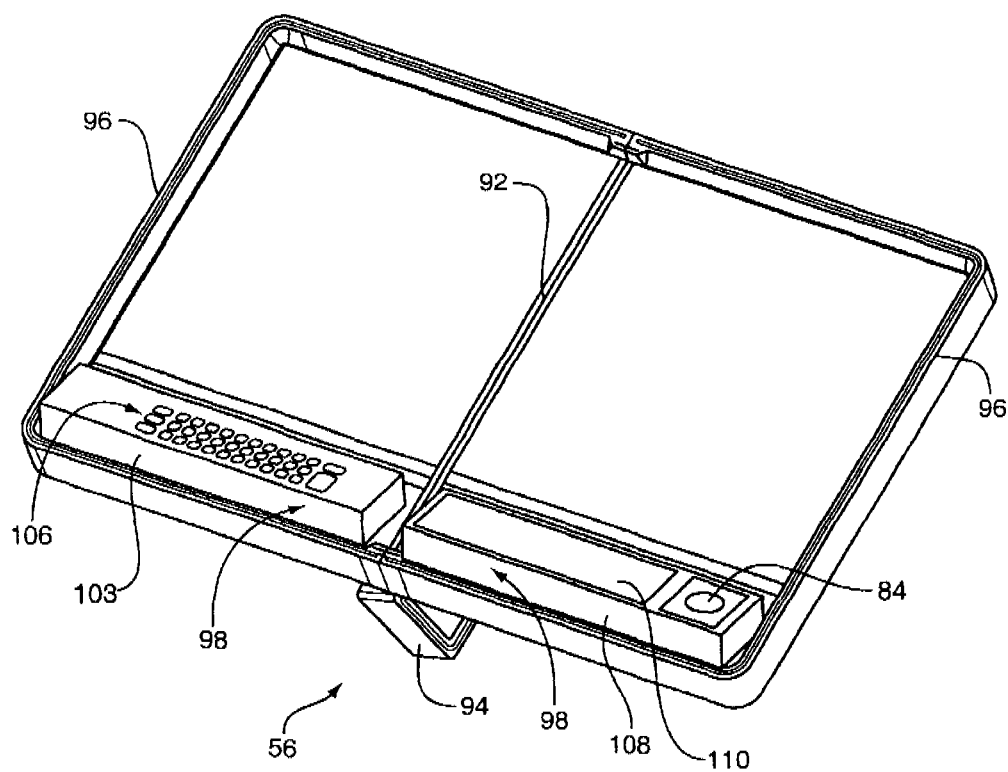
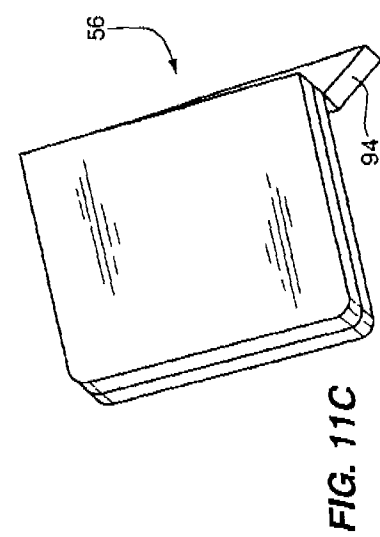
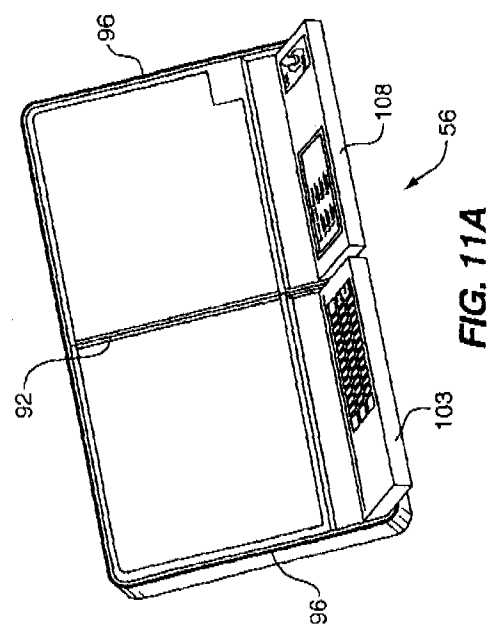
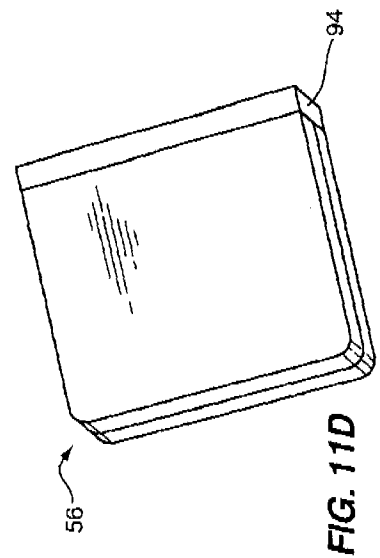
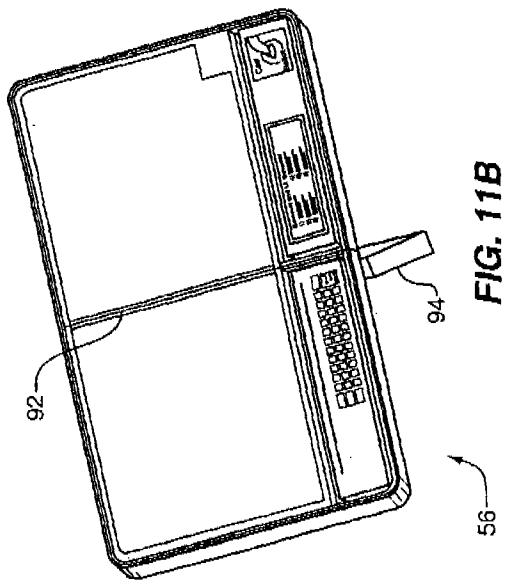


FIG. 10

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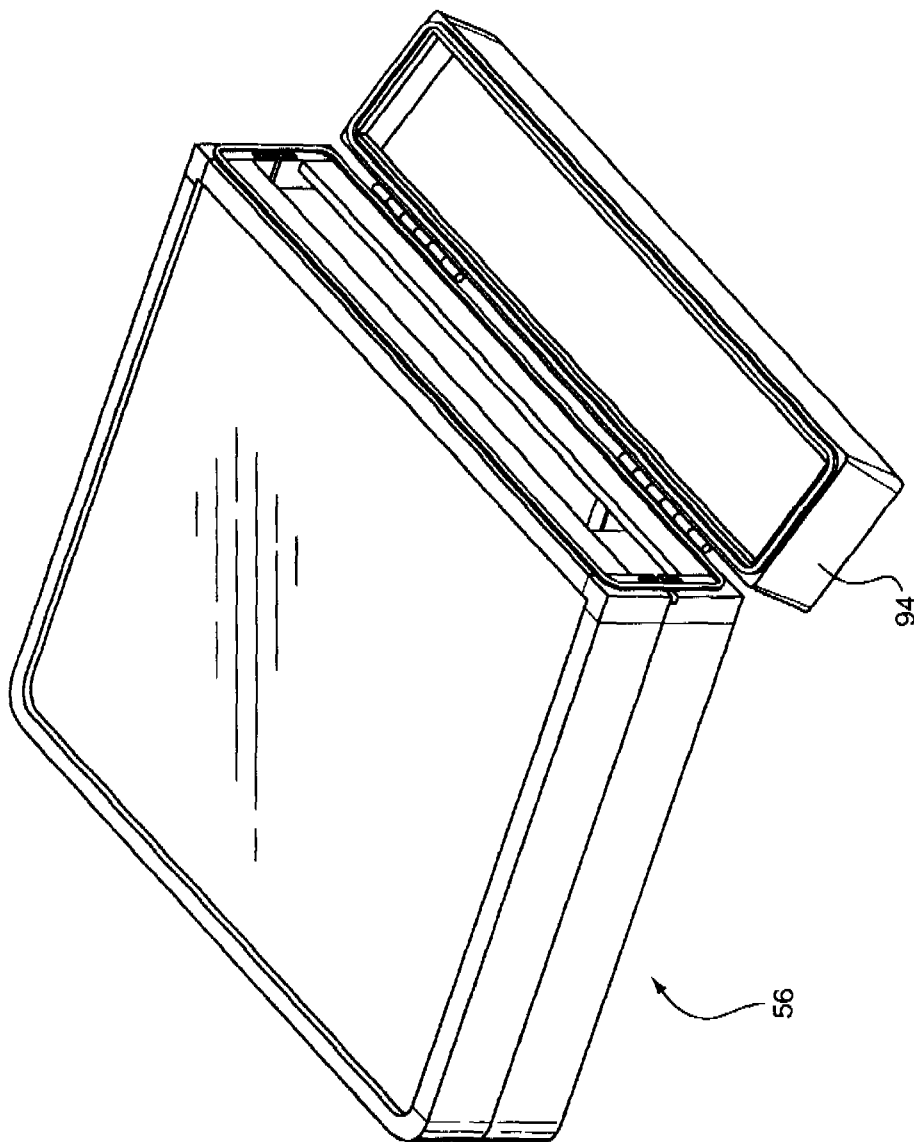


FIG. 12

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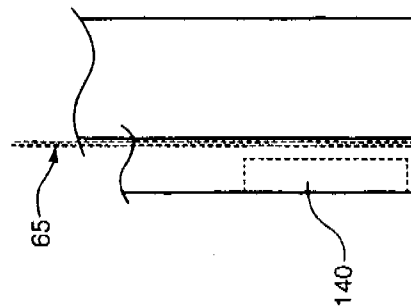
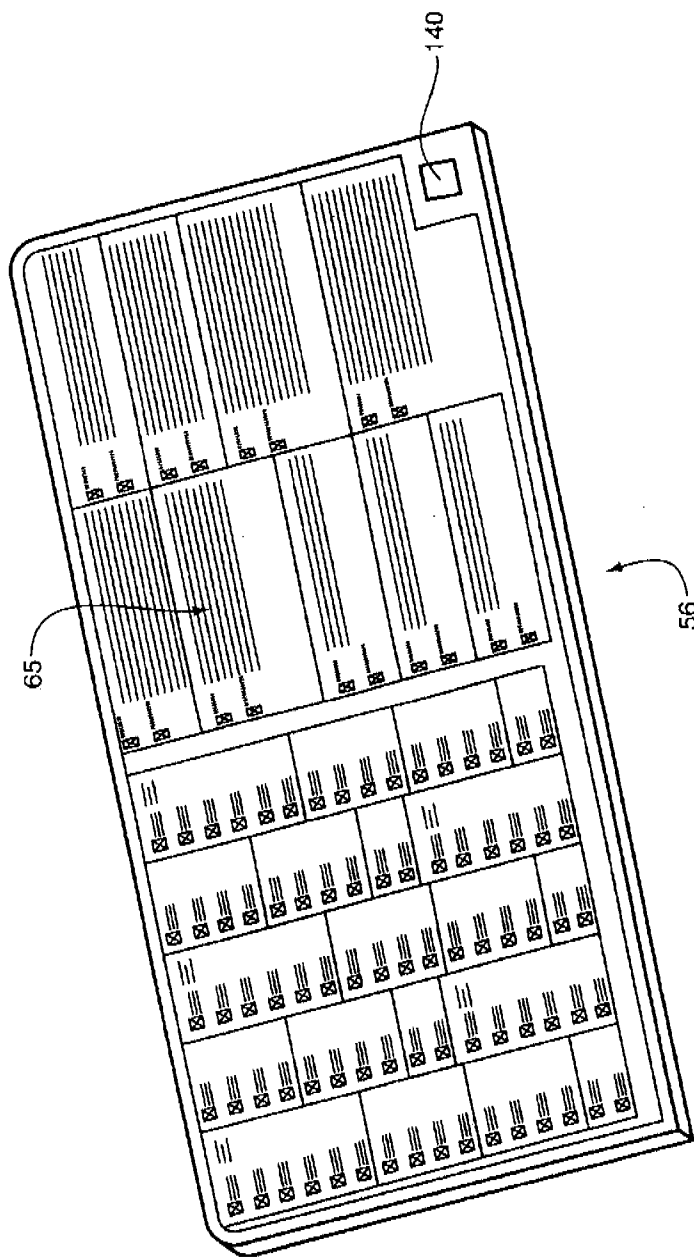


FIG. 14

FIG. 13

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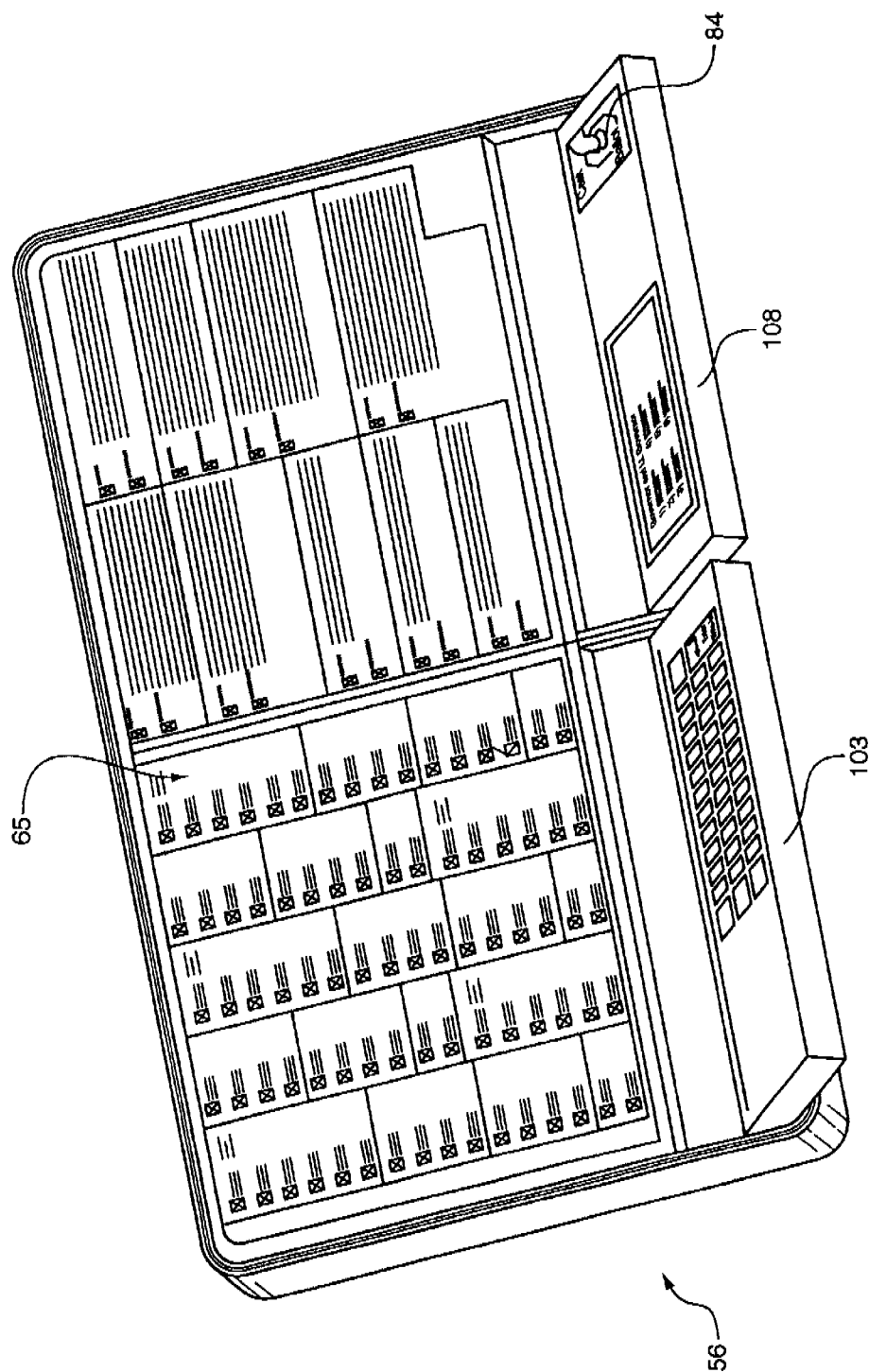
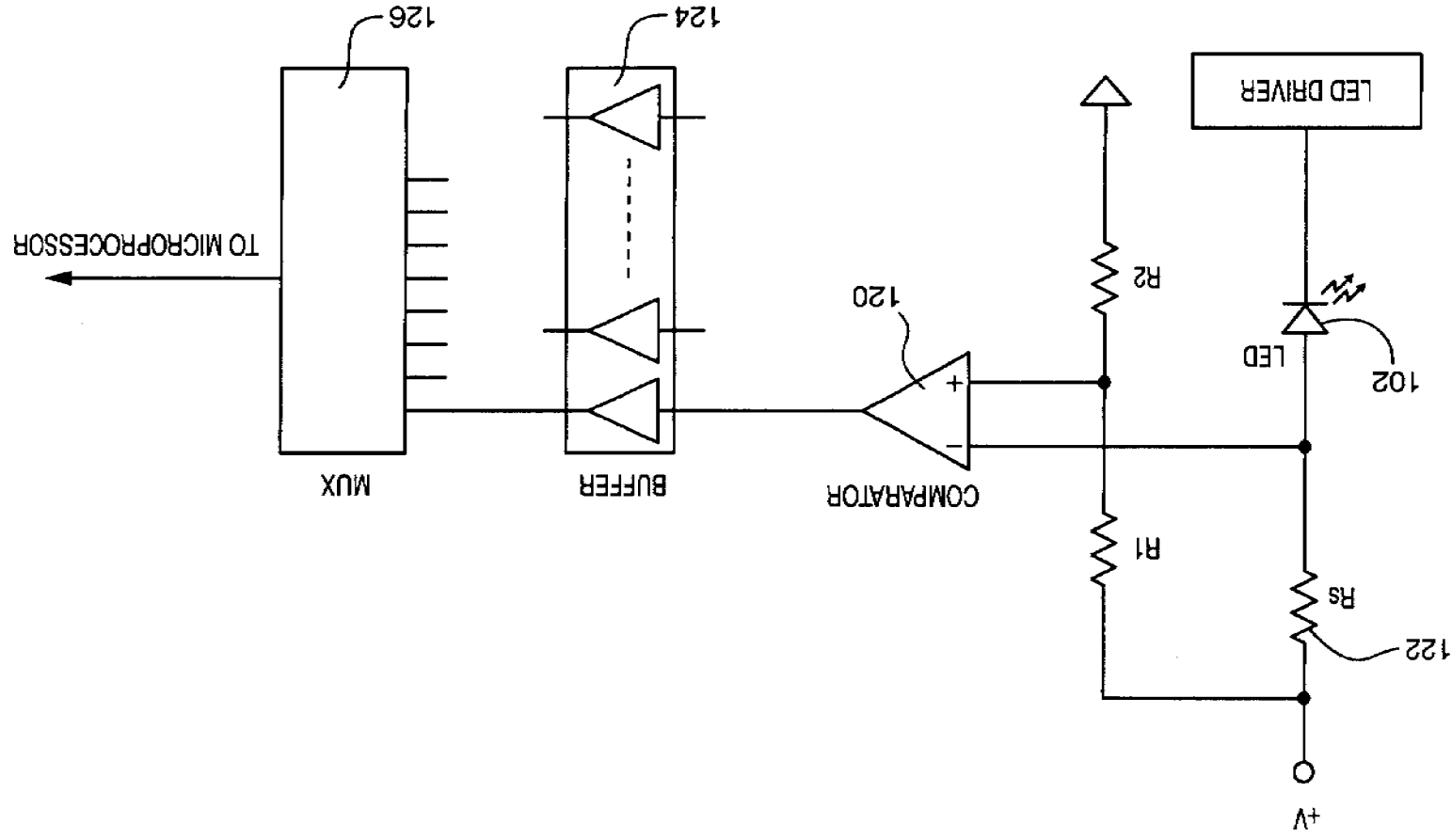


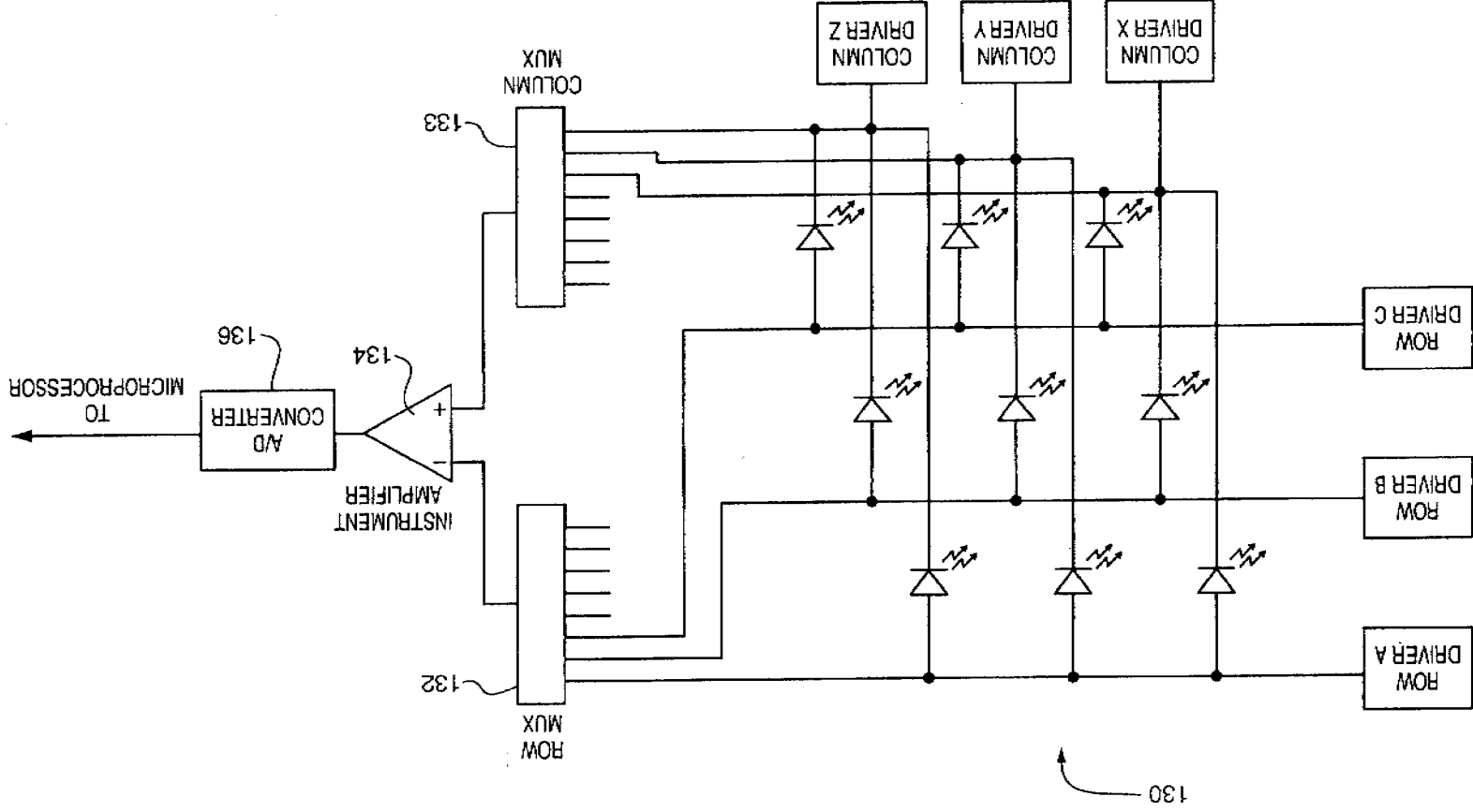
FIG. 15

FIG. 16



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**ELECTRONIC VOTING SYSTEM****Related Applications**

This is a divisional of application Ser. No. 08/953,003 filed Oct. 16, 1997 now U.S. Pat. No. 6,250,548.

The present invention relates to an integrated voting system which is electronic at all stages in the system and, more particularly, to a voting system with a reusable, non-volatile memory module transportable between different levels of the election system to pass data therebetween, and relates further to improved features for determining and verifying that the appropriate ballot form is being used at a particular voting station. The present invention also relates to verifying that the voter's ballot selection displayed to the voter is identical to the ballot image recorded electronically, to improved storage for between election equipment management and testing, and to an improved absentee voting system.

**BACKGROUND OF THE INVENTION**

Voting systems in place around the world typically involve either paper ballots or mechanical counters. The paper ballots used in some areas may be as simple as a form onto which the selected candidate's name is written or on which an X is placed to indicate the candidate selected by the voter. Alternatively, the paper ballot may have holes punched therein adjacent to the desired candidate or ballot issue. With such ballots, the only time the voter is required to write on the ballot is if a write-in candidate is selected. There are many disadvantages to such paper ballot systems. One is the fact that paper ballots can become physically damaged, or altered, between the time the voter makes the selection and the time a ballot-counting machine eventually reads the voter's selection on the ballot. Another disadvantage is that voters can inadvertently punch the hole or place the X next to a different candidate than was intended by the voter. When this goes unnoticed by the voter, the voter ends up casting a vote which was not intended. In addition, write-in votes must be manually read by an election official, which is time consuming and may be very difficult, depending upon the legibility of the voter's handwriting. In many cases, the name written in cannot be read and the vote does not count. Also, paper ballots must be custom printed for each election, with at least one ballot printed for each potential voter. Since these ballots are specific to a particular election, the costs are significant for each election.

Many other election systems include a system of mechanical switches and levers which are actuated by the voter to increment one of a plurality of mechanical counters. At the end of the election, the counters for each of the candidates at each of the voting booths is tallied and the results are reported to the jurisdictional headquarters. While this system solves some of the problems of the paper ballots, the machines required at each of the voting booths are fairly expensive and have many mechanical parts which require routine maintenance and repair. In addition, these machines are heavy and cumbersome to move and set up. Another disadvantage is the manual tallying of the counters required at the precinct level and the manual reporting of the results to the jurisdictional headquarters.

There are a variety of other non-electronic methods for conducting an election. Unfortunately, each suffer from many of the problems discussed above: illegible ballots which must be discarded, votes inadvertently cast for unintended candidates, excessive costs for election consumables, and the ease with which the election results may be altered by tampering.

While some electronic voting systems have been developed to solve some of these problems, none of these proposed electronic voting systems has been successful enough to result in widespread use. In the areas where non-mechanical means for conducting elections are used, the electronic components typically make up only a portion of the overall system so that it is not an integrated system. Thus, some of the steps in the election process are still performed manually.

Some of the proposed electronic systems include a form of transportable memory, which is used to transport data between the jurisdictional headquarters and the precinct. It is believed that all of the transportable memory methods proposed to date require either internal batteries to maintain the data contained therein, or else the memories are physically altered to maintain the stored data. One drawback of the internal battery technique is the risk of power interruption when the batteries lose their charge. In addition, the batteries must be recharged or replaced on a regular basis, adding to the cost of the system. An example of a physically altered memory is an optical disk which can be written to only once for each memory location. Thus, the optical disk must be replaced for subsequent elections, or else the optical disk must have sufficient capacity to store data for multiple elections, at the end of which the optical disk must be replaced. Of course, the cost of these disks is another election consumable cost.

In addition, the transportable memory devices disclosed in the prior art are intended to be transported to a specific precinct as they each contain data relevant only to that specific precinct. Such a system will not operate properly if the wrong transportable memory device is transported to a particular precinct. This would mean, at a minimum, at least two precincts would have their voting terminals incorrectly configured and would, at a minimum, delay opening of the polls at those precincts which were affected. Worse yet, the error might not be discovered and the entire election conducted with the incorrect configuration for some number of precincts. One known system requires two memory modules to complete the voting process at the precinct, further raising the potential for error.

A variety of methods for securing the data in these proposed electronic systems has been disclosed. Most take the form of either redundantly storing the data or disabling the device so that no further data can be written to that device. While redundantly storing data may at first blush appear to add some level of security, it does not protect against writing the wrong data redundantly. In order to be sure that the wrong data is not written, it must be verified as correct prior to writing it redundantly.

Other electronic-based systems include video display screens similar to computer monitors which present the required information to the voter. Such systems require the voter to scroll through the available options to make their selection. This may be confusing to some voters who may become lost and frustrated in the hierarchy of screen formats, so as not to complete their ballot or to erroneously do so. Further, many voters are intimidated by operating computer-based technology and may choose not to vote.

Another electronic-based system includes voting tablets with printed ballot overlays laid on top of the voting tablet. The voter can actuate selected switches from a matrix of switches to make their selections. Unfortunately, as with many of the other systems, the feedback provided to the voter that the desired candidate was selected is disconnected from the data electronically stored regarding the cast ballot

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in the electronic system. In other words, it is possible that a voter would receive an indication or feedback that one candidate had been selected when actually the system recorded a vote for a competing candidate.

Another problem with most electronic-based systems is the inability to deal with differing ballot styles even within a precinct, wherein certain voters may be eligible to vote on certain races and other voters eligible to vote on other races. Most electronic-based systems must be manually controlled to provide the proper ballot styles to each voter or the proper combinations selected from among many to provide the correct eligibility for the voter. This places undue burden on the operator and presents significant opportunity for error.

Other proposed electronic-based systems include a machine readable card given to each voter. The voter must be given the appropriate card for that voter, and then properly place the card in a voting terminal before they can vote. Because of the possibility of errors in each of these steps, such systems have their drawbacks as well.

It is against this background and the desire to solve the problems of the prior art that the present invention has been developed.

### SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an improved voting system which is electronic and integrated at all levels.

It is also an object of the present invention to provide an improved voting system which has a relatively low number of consumables for each election conducted.

It is further an object of the present invention to provide an improved election system which is highly accurate, both in terms of maximizing the ability of the voter to accurately select their intended candidate and in the ability of the election system to accurately convert the voter's selection into the final cumulative tally of votes at the jurisdictional headquarters.

It is still further an object of the present invention to provide an improved election system which instills confidence in the voting public as to the accuracy and relative difficulty of tampering with the system.

It is still further an object of the present invention to provide an improved election system which is easy to use both for the voters and for election officials having little training.

It is still further an object of the present invention to provide an improved election system which operates in a variety of environmental conditions, including varieties of ambient lighting, and available connections for power and telecommunications.

It is yet further an object of the present invention to provide an improved election system which is easy to store, easy to set up, and easy to take down.

Additional objects, advantages and novel features of this invention shall be set forth in part in the description that follows, and in part will become apparent to those skilled in the art upon examination of the following specification or may be learned by the practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities, combinations, and methods particularly pointed out in the appended claims.

To achieve the foregoing and other objects and in accordance with the purposes of the present invention, as embodied and broadly described therein, the present invention is directed to an electronic voting system including a head-

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quarters unit with a central computer and a plurality of precinct units, each precinct unit including a network controller. The system also includes a plurality of mobile memory units, each of the mobile memory units connectable to the central computer to provide data to and receive data from the central computer and connectable to any of the precinct units to provide data to and receive data from the network controller, wherein the data is stored in the mobile memory unit in at least one memory device that can be written to once and read from many times. The system also includes a plurality of voting stations, each station being in data communication with one of the plurality of precinct units, each voting station including a voting tablet on which a voter can select the candidates and sides of issues to vote on and can cast a ballot by actuating a cast ballot actuator on the voting tablet to cause an electronic ballot image of the voter's cast ballot to be communicated to the network controller. The network controller provides data representative of the ballot image to the mobile memory unit for storage therein and wherein the mobile memory units are transportable between the precinct units and the central computer to transport data therebetween including representations of the ballot images to the central computer.

The memory device may include flash memory. The memory device may store data magnetically. The data provided to the network controller from the central computer via the mobile memory unit may include a plurality of different ballot styles that may be appropriate for different precincts within the jurisdiction. The electronic ballot image of the voter's cast ballot may also be stored in the network controller. The electronic ballot image of the voter's cast ballot may also be stored at each voting station. The voting tablet may include a plurality of display indicators to provide a visible indication to the voter of the ballot selections made by the voter, and the voting tablet further includes a plurality of sensors providing signals representative of the state of the display indicators, the signals providing a redundant indication to authenticate the ballot cast by the voter, the redundant indication of the cast ballot being stored at the voting station. The plurality of voting stations may be connectable to each other with only one of the voting stations directly connected to the network controller to allow the remaining voting stations to be connected indirectly to the network controller through the interconnection of the voting stations. The plurality of voting stations may be daisy-chained together.

The present invention is also directed to an electronic voting system including a central computer for collecting ballots cast by voters and a plurality of voting stations communicating with the central computer, the voting stations each including a base with a plurality of voting switches, a plurality of display indicators, and a plurality of sensors, the voting switches providing an indication to the central computer of the ballot cast by the voter, the display indicators providing a visible indication to the voter of the ballot selections made by the voter, the sensors providing signals representative of the state of the display indicators, the signals providing a redundant indication to authenticate the ballot cast by the voter.

The present invention is also directed to an electronic voting system including a central computer for collecting ballots cast by voters and a plurality of voting stations communicating with the central computer, the voting stations each including a base with voting switches, the base being receptive of a ballot overlay, the ballot overlay including text or other symbology providing information to the voter relating to the various races and issues to be decided

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read/write capability for downloading information immediately prior to the election; uploading data during the election; closing the election with precinct level results; recording audit data; and executing public encryption algorithms to protect the data contained therein.

Once the MMU 58 is fully inserted into the receiving bay of the TNC 50 it is completely enclosed, similar to a common computer disk. The preferred mechanical connection type is the PCMCIA standard, developed for portable computers. The MMU must be "hot insertable", meaning that it is required to be installed when the mating receptacle has power present on respective connector pins. The requirement arises from the fact the TNC 50 needs to have power applied and operational in order to receive the MMU 58. The TNC 50 physically prevents a dead (no power) insertion for security purposes.

#### Voting Tablet

The TNC 50 communicates with a plurality of voting tablets 56 at voting stations 52, as shown in FIGS. 4 and 8. The voting tablet 56 (FIGS. 9-15) is a portable, lightweight unit that when deployed provides an input means for each voter to cast his/her vote. The full text of the ballot is presented on printed material in the form of the ballot overlay 65 which is overlaid on the voting tablet 56.

The voting tablet 56 has a hinge point 92 vertically down the center of the voting tablet 56 so that the voting tablet 56 may be folded into the transportation and storage configuration. Offset from the center hinge area, hinged on the back panel, is a rectangular box or center storage area 94 that runs the length of the voting tablet hinge area. This center storage area 94 is twice as wide as the thickness of the voting tablet 56 and an equal dimension in depth. When in the transportation and storage configuration, the back panels, the edges, and the center storage area 94 of the voting tablet 56 form a protective enclosure. The center storage area 94 serves to seal the center tablet hinge area and provides access for electrical connections to the voting tablet 56 and storage area for cables and the light fixture. There are appropriately placed latches to prevent tampering and a handle for carrying, with the resulting size of the folded tablet 56 ranging from a large briefcase to a small suitcase. Integrated in the voting tablet edge frame is a tongue-and-groove valence 96, or any other popular technique for sealing protective enclosures to prevent damage to the voting tablet 56 by dust contamination, moisture, or other environmental exposure.

When deployed at the precinct 48, the voting tablet 56 is unlocked and opened up so the two halves are coplanar and a locking device is provided to secure the voting tablet 56 in the open configuration. Integrated mounting hardware is provided that mates the privacy enclosure 54 with the voting tablet 56 to secure and lock it in place. The two halves of the voting tablet 56 are electrically connected at the hinge point 92 using flex or conventional cabling. The center storage area 94 hangs from the underside of the voting tablet 56 with the interface cables and light fixture stowed therein. There are two interface connections used to connect the voting tablet 56 to the network of voting tablets 56 and to the TNC 50. Each interface connection can be used to connect to either a TNC 50 or to another voting tablet 56 so that a plurality of tablets 56 can be daisy-chained together and connected at one end to the TNC 50. One connection is a flush-mounted, circular, female connector and the other interface is a twelve to twenty-four foot cable with a circular, male connector, the mating version of the other interface

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connector. The circular connectors are of the type that have a rotatable collar such that when the connector halves are mated together, rotating the collar locks the two halves in place. The interface connectors and cabling are mounted on a panel in the center storage area 94 that houses a light fixture (not shown). Once the cables are connected and the light fixture deployed, the center storage area 94 is locked into place so that it is secured against the back panel of the voting tablet 56 to prevent tampering.

Deploying the voting tablet 56 and preparing it for conducting an election includes the following tasks: a voting tablet control bank 98 is unfolded or slid out and locked into position; the voting tablet light fixture is removed and hung on the back panel of the privacy enclosure 54; the interface cable is removed from the center storage area 94 and connected either to another voting tablet 56 or to the TNC 50; the voting tablet 56 is secured to the privacy enclosure 54 using integrated hardware; and the center storage area 94 is locked against the back panel of the voting tablet 56.

An alternative embodiment of the voting tablet (not shown) may include a touch screen, including display technology such as LCD, flat panel, CRT, or any large format group display. These types of displays can be easily incorporated in the same network methods as with the first embodiment described, the difference being in the electronic version of the ballot. To use these display types, instead of the EAS 60 producing a graphical ballot overlay (GBO) 65, ASCII text would be created for the display with switch positions associated with the touch screen switch matrix.

Another alternative embodiment would include a voting tablet that is non-folding with a ridge panel and has a separate storage case. This variation would primarily only impact transportation and storage.

The voting tablet 56 includes of a matrix 99 of LED illuminated membrane switches. 100 (tablet switches). When the ballot overlay 65 is placed on top of the voting tablet 56, graphical marks on the ballot overlay 65 are aligned with a particular set of tablet switches 100. To make a selection, the voter presses the graphical mark corresponding to the selection and the underlying switch 100 is activated. This activates an LED 102 associated with that particular switch 100 which, in turn, back lights the graphical mark selected.

The tablet switches 100 are not regularly spaced, but have gaps in the matrix with some columns and rows completely omitted. An analysis of the probable layout of the ballot types indicate that there are certain columns, rows, and individual switches in the matrix that have a high probability of never being active for an election. Removal of these switches reduces the cost of producing the voting tablet 56 while increasing the mean-time-between-failure (MTBF) of the tablet 56 and maintaining a high degree of flexibility.

The electrical configuration of the voting tablet 56 houses the majority of the electronics in the voting tablet control bank (VTCB) 98. The control bank 98 is electrically connected to the main voting tablet 56 through flex or conventional cabling.

The voting tablet control bank (VTCB) 98 includes two slide-out sections along the bottom part of the voting tablet 56 and the two sections are coincident with their respective halves of the voting tablet 56. The VTCB 98 is hinged along the bottom edge of the voting tablet 56 so that it swings outwardly from the inclined tablet and comes to rest on the bottom of the tablet sidewall. The width of the VTCB 98 can range from two to ten inches depending on the desired control and communication methods therein. The VTCB 98

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is split in two pieces to facilitate the folding tablet 56. A first half 103 houses a microprocessor 104, memory, and related circuitry and the interface to the TNC 50 while the upper surface of the first half 103 presented to the voter supports a keyboard 106 for write-in entry. The other half 108 is used for the "Cast Ballot" button 84 and a display 110.

In the present invention, the width of the VTCB 98 is approximately four inches and presents the "Cast Ballot" button 84, the display 110, and the full alphanumeric keyboard 106. The "Cast Ballot" button 84 is well marked and set off by itself and is used by the voter to finalize his vote and have it recorded by the voting system. In addition to the voting tablet 56 going blank when the voter presses the "Cast Ballot" button 84, an audible tone is emitted by the tablet 56 further indicating that the vote has been cast. Prior to pressing the "Cast Ballot" button 84, as the voter makes selections within a contest, the large-format, electronic, flat-panel display 110, or LCD screen, displays the contest in one of a plurality of alternate languages as selected by the TNC 50. The voting tablet display 110 can accommodate an average size initiative or referendum. This allows those measures to be displayed in a language other than that which is printed on the ballot overlay 65. If no foreign language is required or requested, the current active contest is displayed in English. The voting tablet display 110 is also used for the public counters that are tablet specific and appear in the voting tablet display 110. Public counters are required by some jurisdictions and if so, a number is displayed that is identified as the number of voters that have voted on that voting tablet 56 during the present election. Another use for the voting tablet display 110 is to echo voter write-in selections and to provide guidance and help messages should the voter request them.

Many jurisdictions require that write-in selections be offered for all candidate races. To enter a write-in vote, the voter selects the write-in option within a particular race. The display 110 flashes a message that may read "enter write-in vote" or the like and the voter can use the keyboard 106 to enter the name of the write-in candidate. When the voter selects the first character, the display 110 is updated to read "Press enter when done or resume voting" and the first selected character is also displayed. With each keystroke, the display 110 is updated until the voter is finished and either presses the enter key on the keyboard 106 or makes another selection on the ballot. In each case, the candidate written in for that race is stored in temporary memory with the other selections the voter has made. The voter is still free to change his/her selection even though a write-in has been entered for that race. Should the voter re-activate the write-in switch in a race where a candidate has been entered, the display 110 will show the name of the written-in candidate. The voter can erase the current name and enter a new one or select a registered candidate for that race that will erase the previously written-in candidate.

The VTCB 98 has an electronic connector located at the front corner that allows an external device to be connected, upon request or as a standard feature, to provide input access for disabled voters, through a remote selection terminal (RST) 112. When the RST 112 is plugged in, activation of contest switches can be accomplished remotely through various means that will enable persons with disabilities to vote unassisted. When the RST 112 is connected to the voting tablet control bank, contest lights start automatically sequencing through each race on the ballot and when a light is active and the voter desires that selection, the RST 112 receives a stimulus from the voter and the selection is made. The sequencing would continue until all selections have

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been made with a second input from the RST 112 casting the ballot. The RST 112 can employ any of several means for sensing a stimulus from the disabled voter including a finger-operated switch, a foot-operated switch, a head-operated switch, or a breath-operated switch, or other known means for receiving inputs from disabled persons.

While other switch types as mentioned above can be used in the RST 112, a popular switch known as a "jelly switch" 114 is the preferred switch type. Jelly switches 114 are typically round, three to six inches in diameter and one-half to two inches thick. By pressing anywhere on the large target top surface, the switch 114 is activated. Electrically, the switch 114 is a simple momentary contact ideally suited for the scanning routine of the voting tablet 56. The jelly switch 114 comes standard with a 1/8" monaural phono jack which presents two contacts on the phono jack.

The preferred embodiment of the present invention uses two jelly switches 114 in the RST 112, one for making selections and the other for casting the ballot. The two switches 114 are plugged into an adapter cable that accepts two 1/8" monaural phono jacks at one end and converts the four contacts into three with the other end of the cable terminating at a 1/8" male stereo phono jack. The cable combines two contacts into a common ground for the two switches 114. The 1/8" male stereo phono jack of the adapter cable is then plugged into the VTCB 98 which has the female mating half. The contacts of the VTCB 1/8" female stereo phono jack serve two purposes. The first, is to sense that a switch set has been inserted in to the female stereo phono jack and the second is to sense switch activations by the jelly switches 114. A simple grounding technique accomplishes the insert sense whereby when the jack is inserted, the jack completes a circuit path to ground which can be digital sensed by interface electronics. This technique does not interfere with sense activation and the switches then perform normally by completing a current path when activated.

Jelly switches 114, such as one manufactured by TASH Inc., of Ajax, Ontario, Canada, under model name "Button Buddy" and the adapter cables, model number 4342, also manufactured by TASH Inc., are readily available on the commercial market.

To further support access to persons with disabilities, the present invention accommodates blind persons. Next to the jelly switch jack is a headphone jack where common monaural headphones 116 are plugged into the VTCB 98 through the RST 112. A text-to-speech converter transforms the text echo on the LCD screen 10 of the voting tablet 56 to speech for the headphones 116, with a D/A converter or a pulse width modulator. The audio output operates on the same scanning algorithm as previously described and simply adds the text-to-speech converter output. The conversion from text-to-speech is a well developed technology with several commercial sources for such products, such as the one manufactured by Dialogic Corporation, of Parsippany, N.J., under product name "TextTalk"™. The software routine has access to the text that is displayed on the Voting Tablet LCD and uses this information to convert the text into comprehensible speech. The converted signal is delivered to the headphone jack, and then on to the ear piece(s) of the headphones. Plugging the headphones 116 into the female stereo phono jack activates the text-to-speech function and the jelly switches 114 activate the scanning routine. The jelly switches 114 have Braille labels applied to the top surface that identify the function of the switches. As the scanning routine illuminates a selection within a race, the text-to-speech converter supplies the audio equivalent through the

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headphones 116. Selections are made by activating the proper jelly switch 114 until all selections have been made. Casting the ballot can occur any time by activating the cast ballot jelly switch.

The process by which the RST 112 works together with the voting tablet 56 to scan through the ballot will now be described, with reference to FIG. 30 (with reference numbers for the process steps in parentheses). The RST scanning routine starts with the microprocessor 104 polling the RST sense logic circuit as part of its polling of the voting tablet switch matrix 99, after the voting tablet 56 is armed for voting. It continues polling until either it senses (270) the insertion of the switch 114 into the RST 112 or a switch actuation on the voting tablet 56. If a voting tablet switch actuation is detected first, then the RST sense circuit is no longer polled and voting continues from the voting tablet 56. If the microprocessor 104 detects a switch insertion into the RST 112, the scanning routine begins sequencing (272) the first race on the voting tablet 56. Sequencing a race involves illuminating the first selection within the race, and momentarily pausing long enough for the voter to actuate the jelly switch 114. After the pause, if no jelly switch actuation is sensed (274), the next selection within the race is illuminated (272) followed by a pause. This continues until all selections have been illuminated. If all selections have been illuminated and no selection sensed, the sequencing starts back with the first selection. This pattern repeats for three to five cycles and if no selection is made during that time, the routine moves the sequencing to the next race. (276). This is a "time-out" condition which allows the voter to exit that particular race without making a selection.

If at any time during the sequencing of a race a jelly switch actuation is detected, the sequencing routine lights the currently illuminated selection solidly and moves to the next race and begins the selection sequencing (276). As the next race is sequencing, the voter is able to visually verify their selection in the previous race. This process continues until all races have been sequenced, or the cast ballot switch is actuated (278). Once the cast ballot switch is actuated, the selections made up to that point become the voter's ballot image and any races where no selection has been made become a "no vote".

Once all races have been sequenced and the cast ballot switch has not been actuated, the scanning routine returns to the first race and continues sequencing (272). If a selection had been previously made for a race, as visually indicated by the solidly-lit LED, that LED remains illuminated indicating its selection but the other selections continue to be sequenced giving the voter an opportunity to change their vote.

The voter is able to scroll through the races by actuating the jelly switch 114 and holding it down. The sense circuit acknowledges the difference been a momentary actuation and a continuous actuation and sequences at a similar pace through the races, illuminating the race lights indicating the active race.

This same sequencing process is used if the sense circuit detects headphones 116. When a selection within a race is illuminated, the text-to-speech converter output the audio equivalent of the selection.

#### Visual Vote Verification (V<sup>3</sup>)™

The present invention provides for an independent means of producing and recording the ballot image. A proposed means for producing the independent ballot image is accomplished by monitoring the current or voltage to the LED 102

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associated with each switch 100 on the voting tablet membrane switch matrix 99. The voting tablet 56 acknowledges the switch activation by issuing a command that turns on the corresponding switch LED 102, indicating to the voter that the selection has been made. Monitoring the current or voltage supplied to the LED 102 can be accomplished through several different approaches, three of which are described below.

The first approach, shown in FIG. 16, uses a common integrated circuit (IC), known as a comparator 120. The comparator 120 determines if the LED 102 is off or on by measuring the voltage on one side of a current sense resistor 122 and comparing it to a fixed reference voltage. The sense resistor 122 is connected in series between the LED driver and the LED 102. One side of the sense resistor 122 is also connected to the negative input of the comparator 120. The positive input of the comparator 120 is connected to the mid-point of a voltage divider network made with two resistors connected in series. The voltage at the mid-point of the divider network is determined by the value of the two resistors. In a possible embodiment, the positive input of the comparator 120 is set to 0.9 of the supply voltage.

In operation, if the LED 102 is off, no current flows through the sense resistor 122 and the negative input of the comparator 120 is equal to the supply voltage and the output of the comparator 120 is a logic zero. When the LED 102 is turned on, current flows through the sense resistor 122. The sense resistor 122 is selected so that the amount of current that flows through it when the LED 102 is on multiplied by its resistance is less than 0.9 of the supply voltage. For example, if the current through the LED 102 is 10 mA and the supply voltage is 5 Volts, the sense resistor 122 could be selected to be 400 ohms. In this example, the negative input of the comparator 120 would be 4 Volts when the LED 102 is on. The output of the comparator 120 would then be a logic one. This circuit can thus detect an open circuit LED 102 or LED driver. If either of these conditions exist, no current will flow through the LED 102 when the microprocessor 104 has commanded it to be on. The comparator 120 will be logic zero and thus the microprocessor 104 could sense this failure. This circuit will also detect a shorted LED driver. If the driver is shorted, current will always flow through the LED 102. If the microprocessor 104 commands the LED 102 to be off, current would be flowing through the LED 102. The output of the comparator 120 will be a logic one and thus the microprocessor 104 could sense this failure.

The logic state of the comparator 120 is then communicated to the microprocessor 104 through a series of multiplexors and buffers to be analyzed. The output of the comparator 120 is wired to a buffer IC 124 with output control. The outputs of the buffer 124 are then fed to a multiplexor IC 126 with output select. The output of the multiplexor(s) 126 is then connected to an appropriate input of the microprocessor 104. The output control and output select lines of the buffers 124 and multiplexors 126, respectively, are under microprocessor control so that any one of the LEDs 102 can be monitored at any given time.

The output control of the buffer 124, plus the output select of the multiplexors 126, allows each LED 102 in the membrane switch matrix 99 to have its own specific address with an associated LED position in the matrix 99. Therefore, the microprocessor 104 loads the address bus with the address of a specific LED 102, which in turn, configures the buffers 124 and multiplexors 126 to pass the results of the corresponding LED comparator 120 to the microprocessor 104. A simple software routine that utilizes the list of LED addresses can quickly accumulate the state of the compara-

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO  
DIVISIÓN DE NUEVAS CREACIONES**

2020  
Bogotá, D.C.,

Abogado  
**ENRIQUE ARANGUREN LAURENS**

|        |            |          |
|--------|------------|----------|
| ASUNTO | Radicación | 06-65916 |
|        | Trámite    | 011      |
|        | Evento     | 379      |
|        | Actuación  | 430      |
|        | Oficio     | Nº 7558  |
|        | Folios     | 018      |

|                         |                                     |                               |                          |
|-------------------------|-------------------------------------|-------------------------------|--------------------------|
| Patente de Invención    | <input checked="" type="checkbox"/> | Patente de Modelo de Utilidad | <input type="checkbox"/> |
| Vía Nacional            | <input checked="" type="checkbox"/> |                               |                          |
| Vía PCT (fase nacional) | <input type="checkbox"/>            | Cap. I                        | <input type="checkbox"/> |
|                         |                                     | Cap. II                       | <input type="checkbox"/> |

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

**1. Documentos estudiados**

|                          |                                                                  |
|--------------------------|------------------------------------------------------------------|
| <u>Descripción:</u>      | Folios: <u>5</u> a <u>25</u> como se radicó inicialmente         |
| <u>Reivindicaciones:</u> | Folios: <u>26</u> a <u>29</u> como se radicó inicialmente        |
| <u>Dibujos:</u>          | Folios: <u>30</u> a <u>37</u> como se radicó inicialmente        |
| <u>Prioridad:</u>        | Folios: <u>39</u> a <u>91</u><br>(2005-07-08, US, N° 11/160782). |

**2. Objeto de la invención**

La presente solicitud se titula "BOLETA ELECTRÓNICA DISPOSITIVO DE VOTACIÓN Folio N° 1.

El objeto de la presente solicitud es un dispositivo de entrada de datos orientado especialmente para establecer una eficiente interacción con los votantes que facilite una fácil verificación de las opciones de votación, fácil identificación visual, ingreso de datos sencillo, etc.

De otra parte, el pliego reclama: un dispositivo electrónico similar a una boleta de votación para ser utilizado por los votantes, relacionado en las reivindicaciones 1 a 19, y un método que permite el ingreso de datos correspondientes a escogencias electorales relacionado en las reivindicaciones 20 a 26.

El objeto de la solicitud definido anteriormente se clasificó en la IPC G07C 13/00.

### 3. De la solicitud de Patente

#### 3.1. Título

Se debe adecuar el título de la solicitud a la materia descrita y reclamada en el pliego reivindicatorio. Esto dado que el actual título es confuso por canto no queda claro si la solicitud se trata de una boleta electrónica o un dispositivo de votación.

#### 3.2. Reivindicaciones (artículo 30 D 486)

La materia contenida en el pliego reivindicatorio calificado no define el objeto a proteger por cuanto no es clara la diferencia ni el aporte de la solicitud con respecto al estado del arte.

La reivindicación 1 no especifica claramente cual es el elemento reclamado ya que se refiere de manera general a un "dispositivo electrónico similar a una boleta de votación", esta definición es inadecuada ya que no queda claro si el objeto de la solicitud es una boleta de votación o un dispositivo electrónico en general. Por otra parte, la reivindicación se limita a enumerar una serie de componentes de un dispositivo electrónico sin establecer que tipo de relaciones existen entre tales componentes. Como es bien sabido la esencia de las reivindicaciones consiste en que en estas se detallen las características esenciales que distinguen la invención del estado del arte, esto supone que en el pliego reivindicatorio se consignent características esenciales tales como conexiones, circuitos conformados, la forma de acople de los componentes, la forma de comunicación, etc.

La reivindicación 2 se refiere a un circuito controlador el cual "desempeña una pluralidad de funciones". La realización de funciones es una característica de uso del circuito controlador lo cual no se acepta ya que los usos no poseen carácter técnico.

Las reivindicaciones 3 y 4 se refieren a las funciones que desempeña el circuito controlador lo cual al igual que en la reivindicación 2 no constituye una característica técnica de la solicitud por cuanto los usos del circuito no deben ir en el pliego reivindicatorio.

Las reivindicaciones 7 y 8 se refieren a un posible uso de una hoja preimpresa de papel lo cual como se ha establecido no tiene carácter técnico.

La reivindicación 9 debe especificar cual es la geometría de los circuitos sensibles al tacto en lugar de especificar el resultado de el uso de esta geometría (permitir definir la ubicación exacta de las áreas sensibles al tacto).

Las reivindicaciones 11 y 12 se refieren a la generación de señales, lo cual es un resultado del uso del dispositivo de votación.

Las reivindicaciones 5 y 14 a 19 se refieren a ventajas del dispositivo electrónico. La reivindicación no debe reclamar las ventajas del dispositivo (capacidad de realizar diagnostico, posibilidad de conexión con otro dispositivo, etc.) sino la forma en que el dispositivo consigue estas ventajas, por ejemplo en lugar de especificar la posibilidad de conexión con otros dispositivos, se debe especificar los elementos que permiten esta posibilidad tales como puertos o interfaces de comunicación.

Finalmente las reivindicaciones 20 a 28 se refieren a un método para ingresar datos en el dispositivo de votación. Este método no es otra cosa que las indicaciones de uso del dispositivo de votación, lo cual no tiene carácter técnico. Dado lo anterior el

método mencionado no es aceptable.

En conclusión, el pliego reivindicatorio calificado no cumple los requisitos de claridad, exigidos en el Art. 30 de la Decisión.

#### **4. Reivindicaciones relativas a un uso o a un uso distinto (artículos 14 y 21 D 486)**

Las reivindicaciones 20 a 28 que se refieren a un método para el ingreso de datos correspondiente a escogencias electorales, el cual no cumple con lo establecido en el artículo 14 por cuanto la materia allí relacionada no corresponde ni a un procedimiento ni a un producto que se ajuste a los lineamientos legales vigentes.

El método que relaciona el solicitante indica la forma de utilización de un dispositivo de votación electrónico. Es bien sabido que los usos no son materia patentable por cuanto estos no tienen carácter técnico. Dado lo anterior la oficina considera que el método relacionado en las reivindicaciones 20 a 28 no cumple con los requerimientos establecidos en el Art. 14 de la Decisión.

#### **5. Determinación del Estado de la Técnica**

Considerando que la solicitud reclama prioridad a la fecha de 8 julio de 2005, se buscaron documentos del estado de la técnica relacionados, con fecha de publicación anterior a esta. Se realizó búsqueda de documentos relevantes dentro del estado de la técnica, entendiendo como estado de la técnica la definición provista en el Art. 16 D 486, y las excepciones fijadas en el Art. 17 de la misma.

Se encontró como anterioridades los documentos relacionados a continuación que afectan la patentabilidad del objeto de la presente solicitud

| Nº | Documento* | Título                   | Fecha de publicación |
|----|------------|--------------------------|----------------------|
| D1 | US6688517  | ELECTRONIC VOTING SYSTEM | 2004-02-10           |

\*El documento se anexa con el requerimiento.

#### **6. Análisis de patentabilidad (artículo 14 D486)**

En cumplimiento del Art. 14 D486 se procedió a evaluar los requisitos de novedad, nivel inventivo y aplicabilidad industrial, con el fin de establecer la patentabilidad de la invención reivindicada de la solicitud en estudio.

##### **6.1. Novedad (artículo 16 D486)**

El requisito de novedad se evaluó por comparación entre lo solicitado y los documentos encontrados en el estado de la técnica y que se relacionan con el objeto reivindicado. Para el examen de novedad solo se tuvo en cuenta las características técnicas de la invención. Por tal motivo las reivindicaciones relacionadas con usos y resultados no se estudiarán hasta que estas sean replanteadas.

Las reivindicaciones 1 a 19 se refieren a un dispositivo electrónico caracterizado porque comprende:

- Un cuerpo provisto de una base.
- Una cubierta provista de una lámina protectora transparente.
- Un panel posterior.

- Una pluralidad de membranas.
- Una lámina espaciadora.
- Una pluralidad de áreas sensibles al tacto.
- Un circuito controlador.

La anterioridad **D1** se refiere a un sistema electrónico de votación que maximiza la habilidad para realizar el voto y adicionalmente permite gran precisión en el cálculo del resultado final de la votación. El documento **D1** presenta los siguientes elementos comunes a la materia reclamada en la presente solicitud:

- Un cuerpo **56** provisto de una base
- Una cubierta **65** provista de una lámina protectora transparente (col. 10 líneas 44 a 48).
- Un panel posterior (Fig. 11)
- Una pluralidad de membranas de una pantalla táctil.
- Una lámina espaciadora (Fig. 14)
- Una pantalla sensible al tacto (col. 18 líneas 20 a 29).
- Un circuito controlador (Figs. 16 y 17)

Como se puede ver la anterioridad **D1** comprende todas las características reclamadas en la solicitud en estudio. Dado lo anterior la oficina considera que **D1** afecta la novedad de la presente solicitud.

En conclusión, al hacer la comparación elemento por elemento entre lo solicitado y el estado de la técnica, se encuentra que las características esenciales del objeto de esta solicitud son idénticas a lo comprendido en el documento **D1**, razón por la cual la solicitud no cumple con lo requisitos de novedad establecidos en el artículo 16 de la Decisión.

7. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

| N° | Documento N° | Reivindicaciones afectadas | Requisito que afecta |
|----|--------------|----------------------------|----------------------|
| D1 | US6688517    | 1 a 19                     | Novedad              |

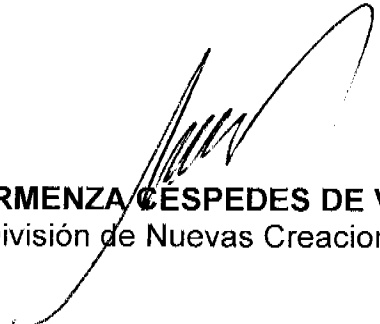
Se recomienda, que tenga en cuenta que el replanteamiento de esos apartes NO podrá implicar una ampliación de la protección que correspondería a la divulgación contenida en la solicitud inicial, de acuerdo a lo que establece el artículo 34 de la Decisión 486.

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En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.



**ALIX CARMENZA CÉSPEDES DE VERGEL**  
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha  
\_\_\_\_\_ 09 JUL 2009

|                                  |                                                |
|----------------------------------|------------------------------------------------|
| <b>CONCEPTO TÉCNICO No. 2130</b> | <b>EXAMINADOR TÉCNICO</b><br>Código No. 202082 |
|----------------------------------|------------------------------------------------|