

ESCOBAR - URIBE ASOCIADOS

A B O G A D O S

Carrera 11A No. 94-76 - Of. 305 - P.O. Box 94948, Bogotá, D.C. - Colombia

Tels: (571) 6162051 - Fax (571) 6161889

www.escobaruribe.com - info@escobaruribe.com

2796/P.

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

E.

S.

D.

SUPERINDUSTRIA Y COMERCIO

Radicacion: 05020069 00000002

Folios: 61

Fecha (MM): 2005-03-18 14:37:50

Tramite: 002 PATENTES D 1 REGISTRO/ 329 COMPLEN

Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

Ref.: Expediente No. 05020069
Solicitud de Patente a nombre de
Ethicon, Inc.

Yo, JIMENA ESCOBAR URIBE, identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 A No. 94-76, of. 305, obrando como apoderada de la sociedad Ethicon, Inc., domiciliada en Somerville, New Jersey, Estados Unidos de América, solicitante de la patente de la referencia, atentamente me permito presentar copia certificada de la solicitud de patente número 10/793,115 presentada en Estados Unidos de América el día 4 de marzo de 2004, con la debida traducción de lo pertinente.

Señor Superintendente,


JIMENA ESCOBAR URIBE

C.C.39.779.452 de Usaquén

T.P. 68228

Cód. 5376

92 2 60

ESTADOS UNIDOS DE AMERICA
A TODOS AQUELLOS A QUIENES EL PRESENTE LLEGUE:

DEPARTAMENTO DE COMERCIO DE LOS ESTADOS
UNIDOS

Oficina de Patentes y Marcas de los Estados Unidos

Febrero 8 de 2005

La presente es para certificar que el anexo es una copia fiel de los registros de la Oficina de Patentes y Marcas de los Estados Unidos, de los documentos de la solicitud de patente identificada más adelante, que cumplieron con los requerimientos para concederse una fecha de presentación de acuerdo con 35 USC 111.

Número de Solicitud: 10/793,115

Fecha de Presentación: Marzo 4 de 2004

Por la autoridad del
Comisionado de Patentes y Marca

(fdo) P. SWAIN
Oficial Certificador
Sello oficial de la Oficina de Patentes y Marcas de los
Estados Unidos de América

NOVEDAD DE LA INVENCION

REIVINDICACIONES

5 1.- Un método para rastrear cartuchos de esterilizante dentro de un esterilizador incluye los pasos de: leer para la presencia de un cartucho dentro de un área de procesamiento de cartucho del esterilizador al transmitir una señal electromagnética no óptica entre el cartucho y un receptor en el esterilizador; y por medio de la señal electromagnética transmitir información
10 de identificación entre el cartucho y el receptor; verificar que un cartucho apropiado se cargue en el esterilizador basado en la información de identificación.

 2.- El método de conformidad con la reivindicación 1, caracterizado además porque la señal electromagnética comprende un
15 acoplamiento magnético entre el receptor y el cartucho.

 3.- El método de conformidad con la reivindicación 1, caracterizado además porque la señal electromagnética comprende un acoplamiento inductivo entre el receptor y el cartucho.

 4.- El método de conformidad con la reivindicación 1,
20 caracterizado además porque la señal electromagnética comprende un acoplamiento conductivo entre el receptor y el cartucho.

 5.- El método de conformidad con la reivindicación 1, caracterizado además porque la señal electromagnética comprende una

transmisión de radiofrecuencia.

6.- El método de conformidad con la reivindicación 5, caracterizado además porque el receptor comprende una o más antenas.

7.- El método de conformidad con la reivindicación 6,
5 caracterizado además porque el receptor secuencia el uso de las antenas para identificar la ubicación del cartucho.

8.- El método de conformidad con la reivindicación 1, caracterizado además porque el cartucho contiene una etiqueta de RFID.

9.- El método de conformidad con la reivindicación 8,
10 caracterizado además porque comprende el paso de alterar una porción de datos almacenados en la etiqueta de RFID.

10.- El método de conformidad con la reivindicación 9, caracterizado además porque los datos almacenados en la etiqueta de RFID incluyen un estado de llenado de esterilizante en el cartucho y los datos de
15 estado de llenado son actualizados cuando el esterilizante es removido del cartucho.

11.- El método de conformidad con la reivindicación 10, caracterizado además porque el cartucho comprende una pluralidad de celdas que contienen el esterilizante y la etiqueta de RFID incluye un estado de
20 llenado de esterilizante en cada una de las celdas y los datos de estado del llenado para una celda son actualizados cuando el esterilizante es removido de esa celda.

12.- El método de conformidad con la reivindicación 10,

caracterizado además porque comprende además los pasos de drenar menos que todos los contenidos de una de las celdas y almacenar esta información en la etiqueta.

13.- El método de conformidad con la reivindicación 9, caracterizado además porque la etiqueta de RFID contiene instrumentación de detección de temperatura y los datos incluyen información de temperatura referente a las temperaturas de embarque y almacenamiento a las cuales se ha sometido el cartucho.

14.- El método de conformidad con la reivindicación 9, caracterizado además porque los datos son actualizados con uno o más parámetros de ciclo.

15.- El método de conformidad con la reivindicación 14, caracterizado además porque los datos son actualizados con una concentración de esterilizante lograda durante un ciclo.

16.- El método de conformidad con la reivindicación 9, caracterizado además porque los datos son actualizados con la cantidad de tiempo que el cartucho ha permanecido dentro del esterilizador.

17.- El método de conformidad con la reivindicación 1, caracterizado además porque los datos de identificación incluyen el tipo de ciclo para el cual una celda o grupo de celdas particular está diseñado.

18.- El método de conformidad con la reivindicación 1, caracterizado además porque la información de identificación contiene una fecha de expiración y además comprende el paso de rechazar el cartucho si

ha pasado la fecha de expiración.

19.- El método de conformidad con la reivindicación 1, caracterizado además porque comprende el paso de leer para la presencia y estado de llenado de una caja de recolección de cartuchos gastados por medio de una señal electromagnética no óptica.

20.- Un cartucho que comprende una o más celdas que tienen en las mismas un esterilizante líquido, y además comprende indicios legibles electromagnéticamente y que contienen datos de identificación acerca del cartucho incluyendo datos que identifican los contenidos de esterilizante líquido del mismo.

21.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque los datos incluyen un estado de llenado de una o más celdas.

22.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque los datos incluyen la fecha de expiración del esterilizante líquido.

23.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque los datos incluyen una fecha de fabricación del cartucho.

24.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque los datos incluyen un número de serie del cartucho.

25.- El cartucho de conformidad con la reivindicación 20,

caracterizado además porque los datos incluyen un número de lote del cartucho.

26.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque el cartucho comprende celdas múltiples y los
5 datos incluyen el estado de llenado de cada celda.

27.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque los indicios comprenden una etiqueta de RFID.

28.- El cartucho de conformidad con la reivindicación 27, caracterizado además porque la etiqueta de RFID contiene memoria
10 actualizable.

29.- El cartucho de conformidad con la reivindicación 28, caracterizado además porque la memoria actualizable contiene datos que especifican el estado de llenado de una o más celdas dentro del cartucho.

30.- El cartucho de conformidad con la reivindicación 29,
15 caracterizado además porque el estado de llenado puede incluir datos referentes a la celda que está siendo parcialmente llenada.

31.- El cartucho de conformidad con la reivindicación 27, caracterizado además porque la etiqueta de RFID contiene instrumentación de detección de temperatura y los datos incluyen información de temperatura
20 referente a las temperaturas de embarque y almacenamiento a las cuales se ha sometido el cartucho.

32.- El cartucho de conformidad con la reivindicación 27, caracterizado además porque los datos actualizables incluyen uno o más

parámetros de ciclo.

33.- El cartucho de conformidad con la reivindicación 32, caracterizado además porque los datos actualizables incluyen una concentración de esterilizante lograda durante un ciclo.

5 34.- El cartucho de conformidad con la reivindicación 27, caracterizado además porque los datos actualizables incluyen la cantidad de tiempo que el cartucho ha permanecido dentro de un esterilizador.

 35.- El cartucho de conformidad con la reivindicación 20, caracterizado además porque los datos incluyen una cantidad de tiempo
10 máxima que el cartucho ha permanecido dentro del esterilizador.

 36.- Una caja de recolección de cartuchos gastados para recibir cartuchos gastados de un esterilizador, la caja de recolección de cartuchos gastados comprende una pared inferior, paredes erguidas fijadas a la pared inferior que se extienden hacia arriba para terminar en un borde superior, e
15 indicios legibles electromagnéticamente y que contienen datos de identificación acerca de la caja de recolección de cartuchos gastados incluyendo datos que identifican su capacidad para recibir cartuchos.

 37.- La caja de recolección de cartuchos gastados de conformidad con la reivindicación 36, caracterizada además porque los
20 indicios son una etiqueta de RFID.

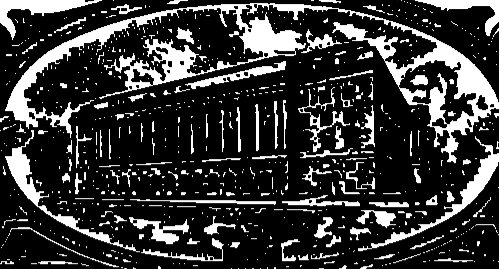
 38.- La caja de recolección de cartuchos gastados de conformidad con la reivindicación 37, caracterizada además porque la etiqueta de RFID incluye además datos actualizables incluyendo una cantidad de

42
9
67

cartuchos actualmente en la caja.

77
18
68

PA 1281043



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

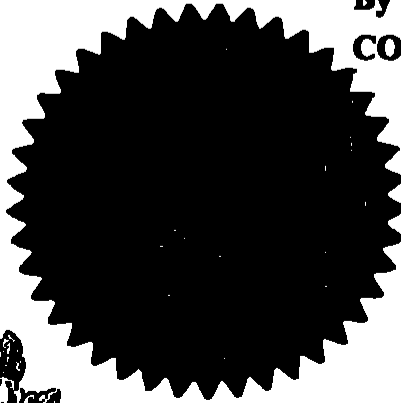
February 08, 2005

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 10/793,115

FILING DATE: March 04, 2004

**By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS**



P. SWAIN

Certifying Officer

UTILITY PATENT APPLICATION TRANSMITTAL		Attorney Docket No.	ASP-5015
		First Inventor	William Wong
		Title	Sterilizer Cassette Handling System With Data Link
		Express Mail Label No.	ER674483275US
APPLICATION ELEMENTS <i>See MPEP Chapter 600 concerning utility patent application contents.</i>		ADDRESS TO: Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	
1. ☒ Fee Transmittal Form (e.g., PTO/SB/17) (submit an original and a duplicate for fee processing)		7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)	
2. ☐ Applicant claims small entity status.		8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)	
3. ☒ Specification [Total Pages 27] (Preferred arrangement set forth below)		a. ☐ Computer Readable Form (CRF)	
- Descriptive Title of the Invention		b. ☐ Specification Sequence Listing on:	
- Cross Reference to Related Applications		I. ☐ CD-ROM or CD-R (2 copies); or	
- Statement Regarding Fed sponsored R&D		II. ☐ paper	
- Reference to sequence listing, a table, or a computer program listing appendix		c. ☐ Statement verifying identity of above copies	
- Background of the Invention		ACCOMPANYING APPLICATION PARTS	
- Brief Summary of the Invention		9. ☐ Assignment Papers (cover sheet & document(s))	
- Brief Description of the Drawings (if filed)		10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney (when there is an assignee)	
- Detailed Description		11. ☐ English Translation Document (if applicable)	
- Claim(s)		12. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations	
- Abstract of the Disclosure		13. ☐ Preliminary Amendment	
4. ☒ Drawing(s) (35 USC 113) [Total Sheets 18]		14. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)	
5. a. ☒ Declaration [Total Pages 3]		15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)	
b. ☐ unexecuted		16. ☐ Request and Certifications under 35 U.S.C. 122 (b)(2)(B)(I). Applicant must attach form PTO/SB/35 or its equivalent.	
b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed)		17. ☐ Other	
i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).			
6. ☐ Application Data Sheet. See 37 CFR 1.76			
18. ☐ If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-Part (CIP) of prior application No.: , filed Prior application information: Examiner Group Art Unit: For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.			
19. CORRESPONDENCE ADDRESS ☒ Customer Number or Bar Code Label 000027777 or ☐ Correspondence Address below			
Name: Phillip S. Johnson, Esq. Address: Johnson & Johnson One Johnson & Johnson Plaza New Brunswick, NJ 08933-7003 USA			
20. TELEPHONE CONTACT Please direct all telephone calls or telefaxes to Andrew C. Farmer at: Telephone: (732) 524-2825 Fax: (732) 524-2808			
21. SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED			
NAME	Andrew C. Farmer Reg. No. 35888		
SIGNATURE			
DATE	March 4, 2004		

72
72
70

FEE TRANSMITTAL	<i>Complete if Known</i>	
	Application Number	
	Filing Date	March 4, 2004
	First Named Inventor	William Wong
	Group Art Unit	
	Examiner Name	
	Attorney Docket Number	ASP-5015

FEE CALCULATION

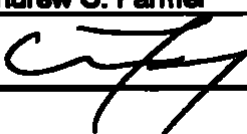
CLAIMS AS FILED

(1)	(2)	(3)	(4)	(5)
FOR:	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE \$770.00
TOTAL CLAIMS	38 - 20 =	18	x 18.00	\$ 324.00
INDEPENDENT CLAIMS	3 - 3 =	0	x 86.00	\$ 0.00
MULTIPLE DEPENDENT CLAIMS	☐	N/A	\$280.00	
			TOTAL FEES	\$1094.00

METHOD OF PAYMENT

☒ Please charge Deposit Account No. 10-0750/ASP-5015/ACF in the amount of \$1094.00.
Three copies of this sheet are enclosed.

☒ The Commissioner is hereby authorized to charge any additional fees which may be required in connection with the filing of this communication, or credit any overpayment, to Account No. 10-0750/ASP-5015/ACF. Three copies of this sheet are enclosed.

SUBMITTED BY:		<i>Complete (if applicable)</i>	
Typed or Printed Name	Andrew C. Farmer	Reg. No. 35,868	
Signature		Date: March 4, 2004	Deposit Account No. 10-0750

73 15 71
DOCKET NO. ASP-5015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: William Wong et al.

For : Sterilizer Cassette Handling System With Data Link

Express Mail Certificate

"Express Mail" mailing number: ER674483275US

Date of Deposit: March 4, 2004

I hereby certify that this complete application, including specification pages, claims, informal drawings and an unexecuted Declaration and Power of Attorney, is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Laurie Phillips

(Typed or printed name of person mailing paper or fee)

Laurie Phillips

(Signature of person mailing paper or fee)

74
14
72

STERILIZER CASSETTE HANDLING SYSTEM WITH DATA LINK

Background of the Invention

5 This application relates to the delivery of sterilant from a cassette to an instrument sterilizer, and more particularly to the extraction of sterilant from the cassette.

10 One popular method for sterilizing instruments, such as medical devices, is to contact the devices with a vapor phase chemical sterilant, such as hydrogen peroxide. In many such sterilizers, it is preferred to deliver the sterilant in liquid form and vaporize it in the
15 sterilizer. One particularly convenient and accurate method for delivering the liquid sterilant is to put a predetermined quantity of sterilant into a cassette and deliver the cassette to the sterilizer. The sterilizer then automatically extracts the sterilant from the
20 cassette and uses it for sterilization procedure. Typically, such a cassette would entail multiple cells containing equal amounts of liquid sterilant with a sterilization procedure employing the sterilant from one or more cells. Such a system is currently available in
25 the STERRAD® sterilization system available from Advanced Sterilization Products in Irvine, California.

U.S. Patent Nos. 4,817,800; 4,869,286; 4,899,519; 4,909,287; 4,913,196; 4,938,262; 4,941,518; 5,882,611;
30 5,887,716; and 6,412,340, each incorporated herein by reference, disclose such cassettes and a method for draining liquid sterilant from a cell within a cassette.

25
15
73

If an operator employs a cassette which has already been used, time can be wasted before the operator realizes that no sterilant has reached the articles during the failed sterilization cycle. A convenient disposal method
5 for spent cassettes would also be desirable.

The present invention overcomes these and other limitations of the prior art.

10 Summary of the Invention

A method according to the present invention for tracking sterilant cassettes within a sterilizer includes the steps of: reading for the presence of a cassette
15 within a cassette processing area of the sterilizer by transmitting a non-optical electromagnetic signal between the cassette and a receiver on the sterilizer; via the electromagnetic signal transmitting identifying information between the cassette and the receiver; and
20 verifying that a proper cassette is loaded into the sterilizer based upon the identifying information.

The electromagnetic signal can comprise, for instance, a magnetic coupling between the receiver and the
25 cassette, or an inductive coupling between the receiver and the cassette, or a conductive coupling between the receiver and the cassette, or a radio frequency transmission.

30 Preferably, the receiver comprises one or more antennas, preferably sequenced in use to identify the location of the cassette.

Preferably, the cassette contains an RFID tag.

76
10
74

The method preferably further includes the step of altering a portion of data stored in the RFID tag, such as filling status of sterilant in the cassette and the
5 filling status data is updated when sterilant is removed from the cassette. Where the cassette contains multiple cells containing the sterilant preferably, the RFID tag includes a filling status of sterilant in each of the cells and the filling status data for a cell is updated
10 when sterilant is removed from that cell. If less than the entire contents of one of the cells is removed, preferably this data is stored on the tag.

In one aspect of the invention, the RFID tag contains
15 temperature sensing instrumentation and the data includes temperature information regarding the shipping and storage temperatures to which the cassette has been subjected.

In another aspect of the invention, the data is
20 updated with one or more cycle parameters, such as a concentration of sterilant achieved during a cycle.

Updateable data can also include the amount of time the cassette has spent within the sterilizer. Identifying
25 data can include the type of cycle for which a particular cell or group of cells is intended (such as cycle times, amount of sterilant to be used etc.). It could also include an expiration date for the cassette and the method further include the step of rejecting the cassette if the
30 expiration date has passed.

Preferably, the method further includes the step of reading the presence and filling status of a spent

7A
12
75

cassette collection box via a non-optical electromagnetic signal.

A cassette, according to the present invention,
5 comprises one or more cells having therein a liquid
sterilant, and further comprises indicia readable
electromagnetically and containing identifying data about
the cassette including data identifying the liquid
sterilant contents thereof.

10

The data can include such things as a filling status
f the cells, an expiration date of the liquid sterilant,
a manufacturing date of the cassette, a serial number of
the cassette, a lot number of the cassette, and a maximum
15 amount of time the cassette may reside within a
sterilizer.

Preferably, the indicia comprises an RFID tag, more
preferably an RFID tag with updateable memory. The
20 updateable memory can contains such data as the filling
status of the one or more cells within the cassette data
regarding the cell being partially filled, temperature
information regarding the shipping and storage
temperatures to which the cassette has been subjected, one
5 or more cycle parameters (such as a concentration of
sterilant achieved during a cycle), and the amount of time
the cassette has spent within a sterilizer.

A spent cassette collection box for receiving spent
30 cassettes from a sterilizer, according to the present
invention, comprises a bottom wall, upstanding walls
attached to the bottom wall which extend upwards to
terminate in an upper edge, and indicia readable
electromagnetically and containing identifying data about

18
76

the spent cassette collection box including data identifying its capacity to receive cassettes.

Preferably, the indicia is an RFID tag and more preferably, is an RFID tag having updateable data including a quantity of cassettes currently in the box.

Brief Description of the Drawings

10 FIG. 1 is a block diagram of a sterilizer employing a cassette handling system according to the present invention;

15 FIG. 2 is a rear perspective view of a cassette handling system according to the present invention;

FIG. 3 is a front perspective view of the cassette handling system of FIG. 2;

20 FIG. 4 is a front perspective view of the cassette handling system of FIG. 2 showing a spent cassette collection box;

25 FIG. 5 is a rear perspective view of the cassette handling system of FIG. 2 showing its carriage in the insert position;

30 FIG. 6 is a rear perspective view of the cassette handling system of FIG. 2 showing its carriage as it moves toward the home position;

FIG. 7 is a rear perspective view of the cassette handling system of FIG. 2 showing its carriage in position to read a bar code on the cassette;

75
19
77

FIG. 8 is a rear perspective view of the cassette handling system of FIG. 2 showing its carriage in the home position;

5

FIG. 9 is a front perspective view of the cassette handling system of FIG. 2 showing its carriage in position to tap the cassette's first cell;

10

FIG. 10 is a cross sectional view of the cassette showing a cell therein;

15

FIG. 11 is a front perspective view of the cassette handling system of FIG. 2 showing upper and lower needles on an extractor subsystem penetrating the first cell of the cassette;

20

FIG. 12 is a front perspective view of the cassette handling system of FIG. 2 showing upper and lower needles on the extractor subsystem in position to penetrate the last cell of the cassette;

5

FIG. 13 is a front perspective view of the cassette handling system of FIG. 2 showing the cassette being ejected therefrom;

FIG. 14 is a flow chart of the cassette handling process;

30

FIG. 15 is a rear perspective view of an alternative embodiment of a cassette handling system of the present invention employing RFID technology;

25 20
78

FIG. 16 is a memory map of an RFID tag of the cassette shown in FIG. 15;

FIG. 17 is a top plan view of an unfolded blank for forming the spent cassette collection box of FIG. 4; and

FIG. 18 is a perspective view of the blank of FIG. 17 folded to form the spent cassette collection box.

10 Detailed Description

FIG. 1 shows in block diagram form a vapor phase sterilizer 10 employing a cassette handling system 12 according to the present invention. The sterilizer 10 comprises a vacuum chamber 14 and a vacuum pump 16 for exhausting atmosphere therefrom. A vaporizer 18 receives liquid sterilant from the cassette handling system 12 and supplies it in vapor form to the vacuum chamber 14. A screen grid electrode 20 is provided within the vacuum chamber 14 for exciting the contents into the plasma phase during a portion of the sterilization cycle. A micro filtered vent 22 and valve 24 allow sterile air to enter the vacuum chamber 14 and break the vacuum therein. A control system 28 ties in to all of the major components, sensors and the like within the sterilizer 10 to control the sterilization cycle.

A typical sterilization cycle might include drawing a vacuum upon the vacuum chamber 14 and turning on power to the electrode 20 to evaporate and extract water from the vacuum chamber 14. The electrode 20 is then powered off and a low vacuum of less than 1 torr drawn on the vacuum chamber 14. Sterilant, such as hydrogen peroxide solution, is vaporized by the vaporizer 18 and introduced into the vacuum chamber 14 where it diffuses into contact

24
29

with the items to be sterilized and kills microorganisms thereon. Near the end of the cycle, power is again applied to the electrode 20 and the sterilant is driven into the plasma phase. The electrodes 20 are powered down and filtered air is drawn in through the valve 24. This process can be repeated.

Turning also to FIGS. 2 to 4, the cassette handling system 12 according to the present invention is shown. It comprises in gross, a carriage 32 for holding a cassette 34, a lead screw 36 and motor 38, an extractor subsystem 40 and a scanner 42.

The carriage 32 comprises a bottom panel 44, a side panel 46 and top panel 48 along with small vertical flanges 50 and 52 on the top and bottom and top panels 48 and 44, respectively, to capture the cassette 34. The bottom, side and top panels 44, 46 and 48 flare outwardly at an entrance 54 of the carriage to aid in insertion of the cassette 34. Two spring catches 56 on the flanges 50 and 52 engage irregular surfaces of the cassette 34 to firmly position the cassette 34 within the carriage 32.

The carriage 32 travels along the lead screw 36 and is supported on an upper rail 58. A lead screw nut 60 attached to the bottom panel 44 and having a threaded opening 62 and an unthreaded opening 63 receives the lead screw 36 and effects horizontal movement of the carriage 32 in response to rotations of the lead screw 36. Flanges 64 extend outwardly from the top panel 48 and flanges 66 extend outwardly from the side panel 46 each having openings 69 for receiving the upper rail 58. The motor 38 is preferable a stepping motor and connects to the lead

82
80

screw 36 to precisely control the horizontal position of the cassette 34 relative to a frame 68.

The extraction assembly 40 comprises an upper needle 70 and a lower needle 72, each being of a lumened configuration. The upper needle connects to an air pump 74 which can force air out through the upper needle 70. The lower needle 72 connects to a valve 76 and from there is plumbed to the vaporizer 18.

10

The scanner 42 is oriented so as to be able to read a barcode 80 on the cassette 34 as well as a barcode 82 on a spent cassette collection box 84. Upon insertion of the cassette 34 into the carriage 32 the scanner 42 reads the cassette barcode 80. The barcode 80 is preferably encoded with information regarding the contents of the cassette 34, including lot numbers and expiration dates. This information can be used to determine whether the cassette 34 is fresh and of the correct type and whether the cassette 34 has been used in the system before and thus is at least partially empty. The code is communicated to the control system 28 which makes these determinations.

20

The scanner 42 can also see the spent cassette collection box barcode 82 when the carriage 32 moves inwardly and away from the scanner 42. Each spent cassette collection box 84 preferably has two barcodes 82, one in each opposing corner so that the scanner 42 can see one of them regardless of which end of the spent cassette collection box 84 is inserted first. With the spent cassette collection box 84 filled, the spent cassettes 34 block the barcode 82 which alerts the control system 28 that there is no capacity for receiving additional spent cassettes 34. Preferably this message will be output to a

30

user, such as on a display screen (not shown). If the cassette 34 is empty it will not be ejected and no new cycles will be run until a spent cassette collection box 84 having capacity to receive a spent cassette 34 is placed into the sterilizer 10.

A forward flag 86 and rearward flag 88 project outwardly and downwardly from the carriage side panel 46. They slide through a slot 90 in a slot sensor 92 which detects their presence within the slot 90, such as by blocking a beam of light. Travel of the front flag 86 and rear flag 88 through the slot sensor 92 provides a reference location of the carriage 32 to the control system 28.

15

The top panel 48 of the carriage 32 can rotate about the upper rail 58. A spring 94 between the top panel 48 and side panel 46 biases the top panel 48 downwardly to hold the cassette 34 within the carriage 32. A disposing cam 96 sits behind the side panel 46 and aligns with an ejecting tab 98 which extends outwardly and downwardly from the top panel 48 and which can project through an opening 100 in the side panel 46 when the top panel 48 rotates upwardly. Such rotation of the top panel 48 releases its hold upon the cassette 34 and due to the ejecting tab 98 projecting through the opening 100 pushes the cassette 34 out of the carriage 32 and into the spent cassette collection box.

30 The disposing cam 96 controls rotation of the top panel 48. It comprises a generally triangular shape, having an outwardly facing side 102, forwardly facing side 104 and rearwardly facing side 106. Turning also now to FIG. 5, it mounts for rotation upon an upwardly extending

34
24
82

spindle 108. A spring 110 biases the disposing cam 96 counterclockwise, urging the outwardly facing side 102 into contact with an abutment 112. Inward movements of the carriage 32 allow the ejecting tab 98 to cam over the rearwardly facing side 106 of the disposing cam 96, thus allowing the disposing cam 96 to rotate clockwise and allow the ejecting tab 98 to pass thereby without effecting rotation of the top panel 48. However, outward movement of the carriage 32 causes the ejecting tab 98 to cam over the forwardly facing side 104 of the disposing cam 96. During such motion contact between the outwardly facings side 102 of the disposing cam 96 and the abutment 112 prevents rotation of the disposing cam 96. The camming of the ejecting tab 98 thus causes it to move laterally toward the side panel 46 thereby rotating the top panel 48 upwardly and releasing the cassette 34 from the carriage 32.

Prior to inserting the cassette 34 the carriage 32 is fully retracted to its outward position (to the left as shown in FIG. 5). In this position also, a forward end 114 on the lead screw nut 60 engages a stop 116 thus positively locating the position of the carriage 32. Turning also now to FIG. 6, manual insertion of the cassette 34 causes the carriage 32 to move inwardly (to the right as shown in FIG. 6) and moves the front flag 86 into the slot sensor 92. This movement is preferably caused by the physical force from inserting the cassette 34, however, a torque or other sensor could be applied to allow the stepping motor 38 to take over this movement upon feeling the force of the cassette 34 being inserted into the carriage 32. Allowing this movement to come from the force of the insertion of the cassette 34 ensures that

85
15
83

the cassette 34 is fully seated within the carriage 32 before the movement begins.

Once the front flag 86 is read by the slot sensor 92
5 the stepper motor 38 takes over and starts to move the carriage 32 inwardly. Turning also now to FIG. 7, during this stage, the scanner 42 scans the barcode 80 on the cassette 34. The control system 28 interprets the
10 information coming from the barcode 80 and determines whether the cassette 34 has been used in the sterilizer 10 before, whether the cassette contains fresh sterilant, and other data as appropriate. Preferably, the information on
the barcode 80 is encrypted to prevent unauthorized
15 parties from creating cassettes which may not meet the quality standards necessary for proper sterilization.

If the control system 28 rejects the cassette 34 a carriage 32 is moved sufficiently inwardly so as to pass the ejecting tab 98 past the disposing cam 96 and is then
20 moved back to the insertion position shown in FIG. 5 to eject the rejected cassette 34.. If the cassette 34 is accepted, the carriage 32 continues inward movement to the home position as shown in FIG. 8 in which the rear flag 88 has just passed out of the slot sensor 92.

Turning also now to FIGS. 9 and 10, the cassette 34
comprises a plurality of cells 118 containing liquid
sterilant 120. Various structures of a cassette may be
employed. The cassette 34 shown comprises a hard outer
30 shell 122, preferably formed of an injection molded polymer, such as high impact polystyrene, high density polyethylene or high density polypropylene, which encloses the individual cells 118, the cells 118 being formed of a blow molded polymer such as low density polyethylene.

86
26
34

However, a more rigid material can be used to form the cassette cells 118 in which case the outer shell 122 could be omitted. In the cassette 34 shown, an upper aperture 124 and lower aperture 126 through the shell 122 allows the upper and lower needles 70 and 72 to penetrate the shell. The cell 118 is formed of a material easily penetrated by the needles. If the cell 118 is formed of a more substantial material, a thinning of the material could be provided at the locations to be penetrated by the needles 70 and 72.

The control system 28 uses the home position of FIG. 8 as a reference position for positioning the various cells 118 in front of the extractor subsystem 40. By moving the carriage 32 a predetermined amount from the home position a given cell 118 can be brought to face the extractor system 40. In FIG. 9, cell one has been placed in front of the extractor system 40. Turning also now to FIG. 11, an actuator 128 drives the extractor subsystem 40 toward the cassette 34 causing the upper and lower needles 70 and 72 to penetrate the upper and lower apertures 124 and 126 and enter the cell 118. After the needles have fully extended, the air pump 74 drives air into the cell 118 through the upper needle 70. The system waits a couple of seconds before starting the air pump 74 and opening the valve 76 to ensure proper placement and settling of the needles within the cell 118. The sterilant 120 flows out through the lower needle 72 and is piped off to the vaporizer 18. After a sufficient time to extract the sterilant 120, the air pump 74 switches off and the actuator retracts the extractor subsystem 40 from the cassette 34.

21
22
85

The vaporizer 18 connects to the vacuum chamber 14 which allows the lower needle 72 to easily be placed at a pressure below atmospheric. Thus, the pump 74 can optionally be replaced by a valve (not shown) open to atmosphere, in which case the incoming atmospheric pressure air will provide the driving force to empty the cell 118.

Rather than employ upper and lower needles 70 and 72, one needle having two lumens therethrough would suffice. One of the lumens would provide pressurizing gas and one would extract liquid sterilant. A further alternative arrangement would be to pierce the cell 118 vertically, or substantially so, from an upper part of the cell 118, preferably with such a double lumen needle. This would minimize leakage around the hole created by the needle entering the cell 118. Such entry would also allow the tip of the needle to come closer to the lowest point of the cell 118 for maximum extraction efficiency. If one desired to extract less than all of the contents of the cell 118, one method would be to position the needle extracting the sterilant, such as the lower needle 72 or the just mentioned double lumen needle, at the level in the cell 118 down to which extraction is desired. Liquid sterilant above the position would be extracted and sterilant below would remain. This would be particularly convenient with the just mentioned vertically traveling needle.

Turning also to FIG. 12, each time the control system 28 determines that a new dose of sterilant 120 is required, the stepper motor 38 moves the cassette to position the next cell 118 in front of the extractor subsystem 40 and a new extraction takes place. Multiple

28
28
36

extractions may be employed for a given sterilization cycle. When the cassette 34 has been depleted, the carriage 32 moves towards the insert position thus causing the ejecting tab 98 to cam over the disposing cam 96 to rotate the top panel 48 upwardly and project the ejecting tab 98 through the opening 100 to drive the cassette 34 out of the carriage 32 as described above and as shown in FIG. 13. The cassette 34 falls into the spent cassette collection box 84 and the carriage 32 returns to the insertion position as shown in FIG. 5.

The foregoing discussion described the operation of the cassette handling system in some detail. FIG. 14 shows, in block diagram form, the basic operation of the cassette handling system 12.

The system of reading barcodes on the cassette 34 and spent cassette box 84 can be replaced with radio frequency identification tags, commonly known as RFID tags. An RFID system 130 is shown in FIG. 15. It comprises a controller 132 connected via an SPDT reed relay 134 to a cassette insertion antenna 136 located on the carriage 32 and a cassette disposal antenna 138 located beneath the spent cassette box 84. Each cassette 34 carries a cassette RFID tag 140. Similarly, each spent cassette collection box 84 carries a collection box RFID tag 142. Preferably, the controller 132 comprises a Texas Instruments multifunction reader module S4100 and the RFID tags 140 and 42 comprise Texas Instruments RFID tag RI-101-112A each of which are available from Texas Instruments, Dallas, Texas.

The control system 28 (FIG. 1) selects one of the antennas, as for instance the cassette insertion antenna 136 and sends a signal to the relay 134 to engage this

88
2A
87

antenna with the RFID controller 132. The antenna reads the information stored on the cassette insertion RFID tag 140 which identifies the cassette 34 and its contents. The information read is similar to the information read using the barcode, however preferably, the RFID tag 140 has the ability to update the information stored thereon. Accordingly, additional data such as the filling status of individual cells 118 within the cassette 34 can be stored in the RFID tag. Thus, if the cassette 34 is removed and then reinserted into the sterilizer 10, or even into different sterilizer 10, the control system 28 can be apprised of the status of each of the individual cells 118 within the cassette 34. This allows the reuse of a partially used cassette 34. Also, since the RFID tag 140 can hold more data than the barcode 80, more data about the cassette 34, its contents and manufacturing can be included thereon.

The spent collection box antenna 138 reads the spent collection box RFID tag 142 to determine the presence or absence of the spent cassette collection box 84. Other data such as a unique identifier for the box 84, the capacity of the box 84, how many cassettes 34 are currently in the box 84 and how many of the cells 118 therein are not empty can be included on the RFID tag 142. The control system 28 can track how many cassettes 34 have been ejected into the box to determine whether it has room for more spent cassettes 34. The antenna 138 can also read the cassette RFID tags 140 and count the number of cassettes 34 within the box 84. When the box 84 is full the control system 28 alerts the operator, as by a message on a screen. This message can also include information regarding the cassettes 34 within the box 84. For instance if not all of the cassettes 34 have been

96
30
88

completely drained the operator can be informed of this to decide if more careful disposal may be indicated.

RFID technology is disclosed in the following U.S.

5 Patents, each of which is incorporated herein by reference: U.S. Patent Nos. 6,600,420; 6,600,418; 5,378,880; 5,565,846; 5,347,280; 5,541,604; 4,442,507; 4,796,074; 5,095,362; 5,296,722; 5,407,851; 5,528,222; 5,550,547; 5,521,601; 5,682,143 and 5,625,341.

10

RFID tags typically comprise an antenna and an integrated circuit produced in a thin form factor so they can be inconspicuously placed upon an object such as the cassette 34. Radio frequency energy sent by the antennas 15 136 and 138 induce sufficient current within the antenna inside the RFID tags 140 and 142 to power the integrated circuit therein. Some types of RFID tags carry their own power source and have longer detection ranges, but that adds additional expense and is probably not justified for 20 the present use.

FIG. 16 shows the memory map for the memory within the RFID tags 140 and 142. A 64-bit unique ID (UID) is set at the factory and cannot be changed. Each RFID tag 5 has its own unique number here. Sixty-four 32-bit blocks can be programmed by the user. These can be populated with information such as the manufacture date, expiration date, product ID, serial number, lot numbers, manufacturing location, filling status of the cells, 30 strength and type of sterilant, time spent within the sterilizer 10 and the like.

Some sterilants are affected by heat. The RFID tag 140 can optionally include temperature collection

91 24 89

instrumentation and update that information on the tag. If design temperature profiles are exceeded, such as a maximum temperature or excessive temperature over a time period, then the cassette 34 can be rejected by the

5 c ntrol system 28. Temperature measuring RFID tags are available from KSW-Microtec, Dreseden, Germany and from Identec Solutions, Inc., Kelowna, British Columbia, Canada. The interior of the sterilizer 10 where the cassette 34 sits may be higher than ambient temperature. 10 Thus, it may be beneficial to put a maximum residence time (on board shelf life) on the tag 140 or even to update on the tag 140 this time the cassette has already spent inside of the sterilizer.

15 To test sterilant measuring equipment in the sterilizer 10, it may be beneficial to provide cassettes 34 having water or other fluids within one or more cells 118. Information regarding the special nature of the cassette 34 and its contents could be written onto the 20 RFID tag.

During a cycle the sterilizer may only require part of the contents of a cell 118. For instance, a particular cycle may call for the contents of one and a half cells. 5 The half filled nature of the cell 118 can be stored and then for the next cycle that cell 118 can be drained.

Preferably, communications between the tag 140 and 142 and the controller 132 are encrypted. For instance, 30 the UID can be XORed with an eight-bit master key to form a diversified key for encrypting the data. Encryption algorithms such as the data encryption standard (DES) triple DES, asymmetrical encryption standard (AES) or RSA security can be used for the encryption. The RFID

92
82
90

controller 132 reads the data and the algorithm in the control system 28 decrypts the data to reveal the stored information.

5 Other methods could be used to communicate between the cassette 34 and the sterilizer 10. For instance information could be stored magnetically on the cassette 34, such as with a magnetic encoded strip, and be read by a magnetic reader on the sterilizer. Wireless technology
10 is becoming cheaper every day and it is envisioned that the cassette 34 could include an active transmitter and a power source (i.e. a battery) such as powered RFID tags or Bluetooth, 802.11b or other communication standard.

15 Further, the sterilizer 10 can be set up to communicate back to a central source, such as the manufacturer or distributor thereof, and provide information regarding its performance and the performance of the cassettes 34. Poorly performing cassettes 34 could
20 be identified, as for instance sterilant monitors in the sterilizer not detecting sterilant during a cycle thus indicating some failure such as an empty cassette or bad sterilant therein. An improperly manufactured batch of cassettes 34 could then be quickly identified and
25 recalled. Such communication could occur over telephone, pager or wireless telephone networks or over the Internet.

Turning now also to FIGS. 17 and 18, the spent cassette collection box 84 is preferably folded from a
30 single sheet of printed cardboard or other stock. FIG. 17 shows an unfolded blank 150 and FIG. 18 shows the blank 150 folded to form the spent cassette collection box 84.

23 23 91
The blank 150 is divided by a series of fold lines (shown dashed) and cut lines into a bottom panel 152, side panels 154, end panels 156 and top flaps 158. Folding tabs 160 extend laterally from the side panels 154.

5 Additional folding tabs 162 extend laterally from the end panels 156. Barcodes 82 are printed on the side panels 154 in a position to be visible in an upper interior corner of the spent cassette collection box 84 when it is folded into the configuration shown in FIG. 18. A pair of
10 top flap locking tabs 164 extend from the top flaps 158 and fit into slots 166 in the opposing top flap 158 when the box 84 is closed and into slots 168 at the intersection of the bottom panel 152 and side panel 154 when the box 84 is opened.

15

To fold the box, the folding tabs 160 on the side panels 154 are folded upwardly and then the side panels 154 are folded upwardly, thereby aligning the folding tabs 160 with the intersection between the bottom panel 152 and
20 the end panels 156. The end panels 156 are then folded upwardly and the end panel folding tabs 162 are folded downwardly over the folding tabs 160. Locking tabs 170 on the end panel folding tabs 162 fit into slots 172 at the intersection between the bottom panel 152 and end panels 156.

To place the box 84 into the open position as shown in FIG. 18, the top flaps 158 are folded downwardly to the outside and the locking tabs 164 fitted into the slots
30 168. Once the box 84 is filled with spent cassettes, the top flaps 158 are folded upwardly over the top and the locking tabs 164 can then be fitted into the slots 166 on the opposing top flaps 158. This unique folding arrangement allows spent cassettes 34 to fall into the

21
92

open box 84 easily without the top flaps 158 getting in the way and also allows easy closure of the box 84 once it has become filled.

5 While the invention has been particularly described in connection with specific embodiments thereof, it is to be understood that this is by way of illustration and not of limitation, and that the scope of the appended claims should be construed as broadly as the prior art
10 will permit.

25
25
93

WHAT IS CLAIMED IS:

1. A method for tracking sterilant cassettes within a sterilizer comprising the steps of:

5 reading for the presence of a cassette within a cassette processing area of the sterilizer by transmitting a non-optical electromagnetic signal between the cassette and a receiver on the sterilizer; and

10 via the electromagnetic signal transmitting identifying information between the cassette and the receiver;

verifying that a proper cassette is loaded into the sterilizer based upon the identifying information.

15 2. A method according to claim 1 wherein the electromagnetic signal comprises a magnetic coupling between the receiver and the cassette.

20 3. A method according to claim 1 wherein the electromagnetic signal comprises an inductive coupling between the receiver and the cassette.

25 4 A method according to claim 1 wherein the electromagnetic signal comprises a conductive coupling between the receiver and the cassette.

30 5. A method according to claim 1 wherein the electromagnetic signal comprises a radio frequency transmission.

6. A method according to claim 5 wherein the receiver comprises one or more antennas.

26
36
94

7. A method according to claim 6 wherein the receiver sequences the use of the antennas to identify the location of the cassette.

5 8. A method according to claim 1 wherein the cassette contains an RFID tag.

9. A method according to claim 8 and further comprising the step of altering a portion of data stored
10 in the RFID tag.

10. A method according to claim 9 wherein the cassette the data stored on the RFID tag includes a filling status of sterilant in the cassette and the
15 filling status data is updated when sterilant is removed from the cassette.

11. A method according to claim 10 wherein the cassette comprises a plurality of cells containing the
20 sterilant and RFID tag includes a filling status of sterilant in each of the cells and the filling status data for a cell is updated when sterilant is removed from that cell.

5 12. A method according to claim 10 and further comprising the steps of draining less than all of the contents of one of the cells and storing this information on the tag.

30 13. A method according to claim 9 wherein the RFID tag contains temperature sensing instrumentation and the data includes temperature information regarding the shipping and storage temperatures to which the cassette has been subjected.

97 31
95

14. A method according to claim 9 wherein the data is updated with one or more cycle parameters.

5 15. A method according to claim 14 wherein the data is updated with a concentration of sterilant achieved during a cycle.

10 16. A method according to claim 9 wherein the data is updated with the amount of time the cassette has spent within the sterilizer.

15 17. A method according to claim 1 wherein the identifying data includes the type of cycle for which a particular cell or group of cells is intended.

20 18. A method according to claim 1 wherein the identifying information contains an expiration date and further comprising the step of rejecting the cassette if the expiration date has passed.

25 19. A method according to claim 1 and further comprising the step of reading the presence and filling status of a spent cassette collection box via a non-optical electromagnetic signal.

30 20. A cassette comprising one or more cells having therein a liquid sterilant, the cassette further comprising indicia readable electromagnetically and containing identifying data about the cassette including data identifying the liquid sterilant contents thereof.

21. A cassette according to claim 20 wherein the data includes a filling status of the one or more cells.

28
96

22. A cassette according to claim 20 wherein the data includes an expiration date of the liquid sterilant.

5 23. A cassette according to claim 20 wherein the data includes a manufacturing date of the cassette.

24. A cassette according to claim 20 wherein the data includes a serial number of the cassette.

10

25. A cassette according to claim 20 wherein the data includes a lot number of the cassette.

15 26. A cassette according to claim 20 wherein the cassette comprises multiple cells and the data includes the filling status of each cell.

27. A cassette according to claim 20 wherein the indicia comprises an RFID tag.

20

28. A cassette according to claim 27 wherein the RFID tag contains updateable memory.

5 29. A cassette according to claim 28 wherein the updateable memory contains data specifying the filling status of the one or more cells within the cassette.

30 30. A cassette according to claim 29 wherein the filling status can include data regarding the cell being partially filled.

31. A cassette according to claim 27 wherein the RFID tag contains temperature sensing instrumentation and the data includes temperature information regarding the

29
39
97

shipping and storage temperatures to which the cassette has been subjected.

32. A cassette according to claim 27 wherein the
5 updateable data includes one or more cycle parameters.

33. A cassette according to claim 32 wherein the updateable data includes a concentration of sterilant achieved during a cycle.

10

34. A cassette according to claim 27 wherein the updateable data includes the amount of time the cassette has spent within a sterilizer.

15 35. A cassette according to claim 20 wherein the data includes a maximum amount of time the cassette may reside within a sterilizer.

20 36. A spent cassette collection box for receiving spent cassettes from a sterilizer, the spent cassette collection box comprising a bottom wall, upstanding walls attached to the bottom wall which extend upwards to terminate in an upper edge, and indicia readable electromagnetically and containing identifying data about
5 the spent cassette collection box including data identifying its capacity to receive cassettes.

37. A spent cassette collection box according to claim 36 wherein the indicia is an RFID tag.

30

38. A spent cassette collection box according to claim 37 wherein the RFID tag further includes updateable data including a quantity of cassettes currently therein.

196
#10
98

ABSTRACT

A cassette handling system for sterilant filled
cassettes employs RFID or other electromagnetic signal
5 technology to track the cassettes. A method for tracking
the sterilant cassettes includes the steps of reading for
the presence of a cassette within a cassette processing
area of the sterilizer by transmitting a non-optical
electromagnetic signal between the cassette and a receiver
10 on the sterilizer, via the electromagnetic signal
transmitting identifying information between the cassette
and the receiver, and verifying that a proper cassette is
loaded into the sterilizer based upon the identifying
information.

15

Please type a plus sign (+) inside this box ☐

PTO/SB/01 (10-03)

Approved for use through 10/31/2002. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)		Attorney Docket Number	ASP-5015	
☒ Declaration Submitted with Initial Filing (unexecuted) OR ☐ Declaration Submitted after Initial Filing (Surcharge (37 CFR 1.16(e)) required)		First Named Inventor	William Wong	
		COMPLETE IF KNOWN		
		Application Number		
		Filing Date	March 4, 2004	
		Group Art Unit		
		Examiner Name		
As a below named inventor, I hereby declare that: My residence, mailing address, and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: STERILIZER CASSETTE HANDLING SYSTEM WITH DATA LINK <i>(Title of the Invention)</i> the specification of which ☒ is attached hereto OR ☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International Application Number and was amended on (MM/DD/YYYY) I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application. I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.				
Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES NO
			☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:				

142
42
100

DECLARATION - Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	
		☐ Additional provisional application numbers are listed on a supplemental priority date sheet PTO/SB/028 attached hereto.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(e) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial No.	Filing Date	Status
		Patented Patented Patented

I hereby appoint:

☒ Practitioners at Customer Number **000027777** --

Place Customer Number Bar Code Label Here

AND

☐ Practitioner(s) named below:

Name

Registration Number

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Address all telephone calls to Andrew C. Farmer at telephone number (732) 524-2825.

Direct all correspondence to:

Customer Number **000027777** OR ☐ Correspondence address below

☒ or Bar Code Label

Name:

Address:

Address:

City:

State:

ZIP

Country

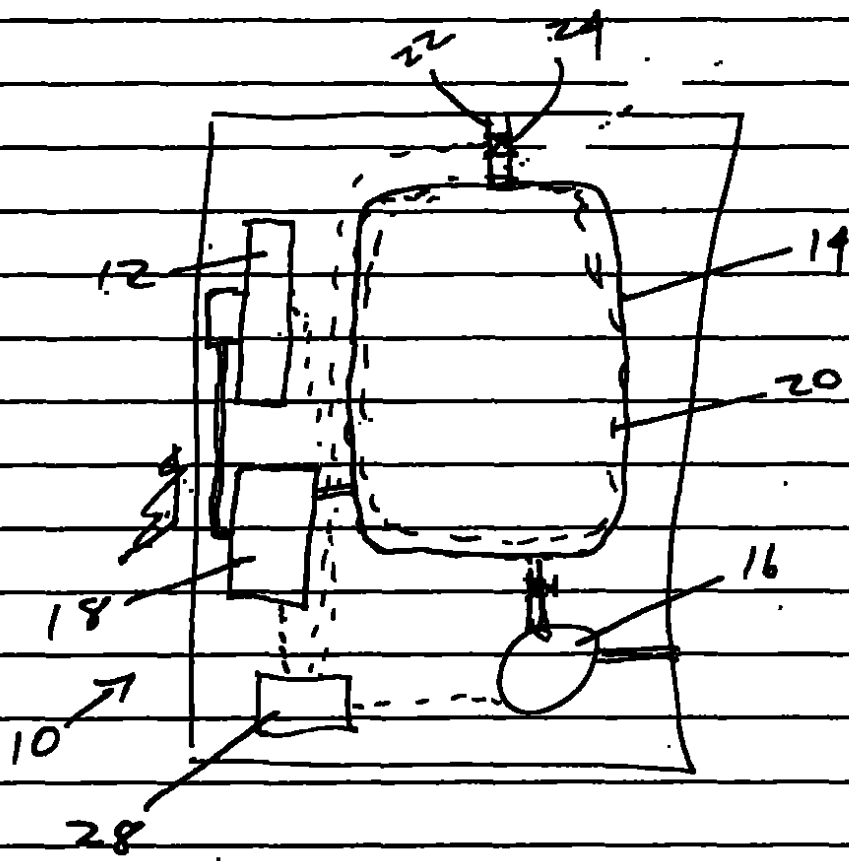
Telephone:

Fax:

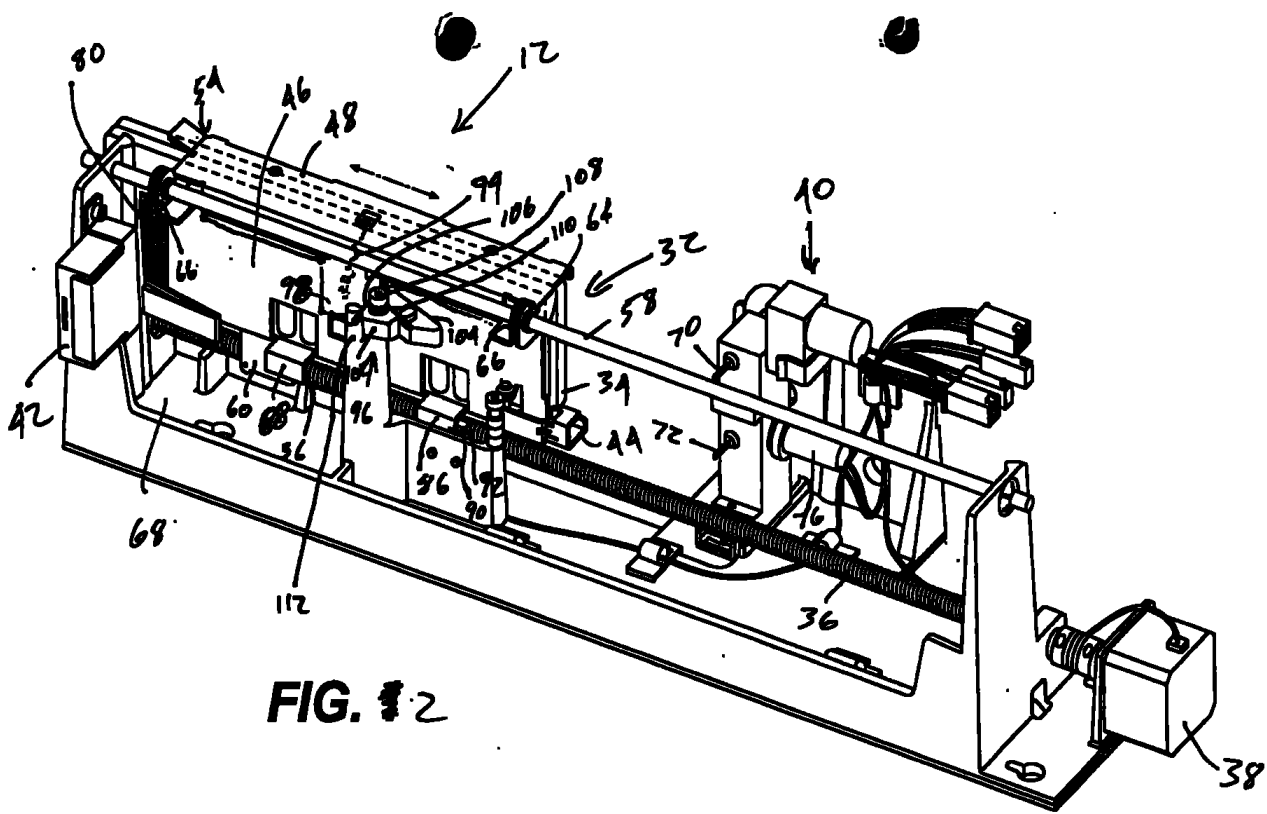
193
43
101

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF SOLE OR FIRST INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any]) Wong		Family Name or Surname William	
Inventor's Signature		Date	
Residence: City Encinitas	State CA	Country USA	Citizenship USA
Mailing Address 338 Cardia Lane			
City Encinitas	State CA	ZIP 92024	Country USA
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF SECOND INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any]) Raju		Family Name or Surname Vishnu R.	
Inventor's Signature		Date	
Residence: City Irvine	State CA	Country USA	Citizenship India
Mailing Address 88 Knollglen			
City Irvine	State CA	ZIP 92614	Country USA
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF THIRD INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any]) Choparens		Family Name or Surname Alfredo M.	
Inventor's Signature		Date	
Residence: City San Juan Capistrano	State CA	Country USA	Citizenship USA
Mailing Address 31342 Via Las Palmas			
City San Juan Capistrano	State CA	ZIP 92675	Country USA

124 44
102



F 16. 1



124

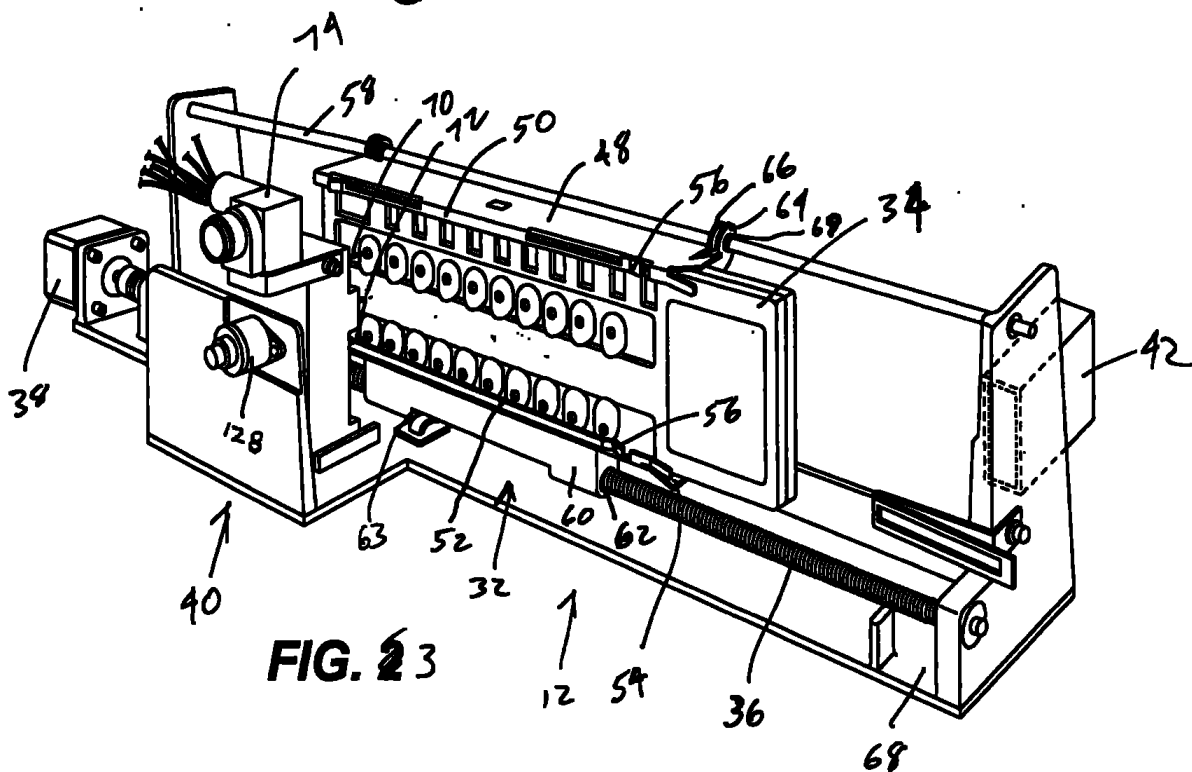
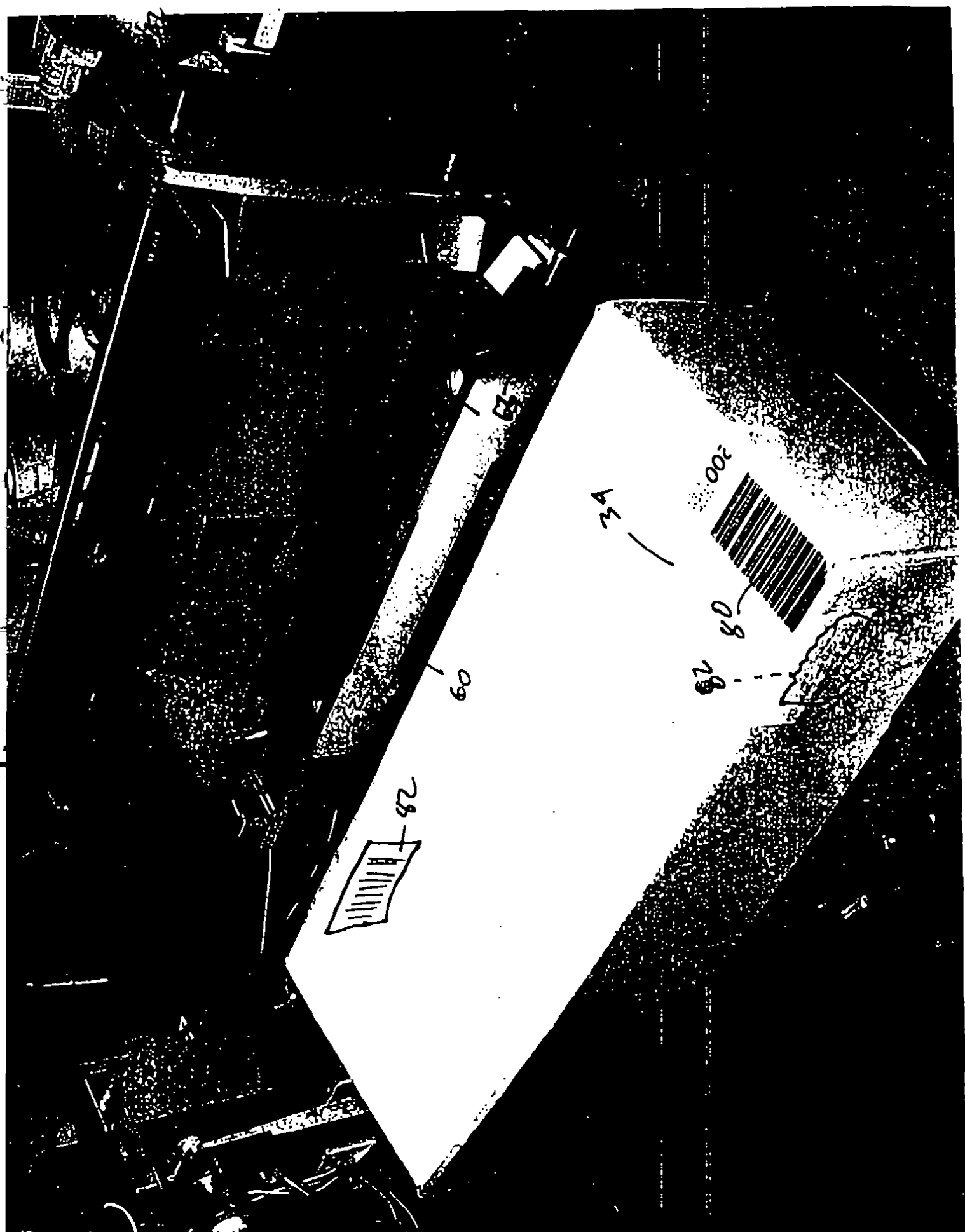


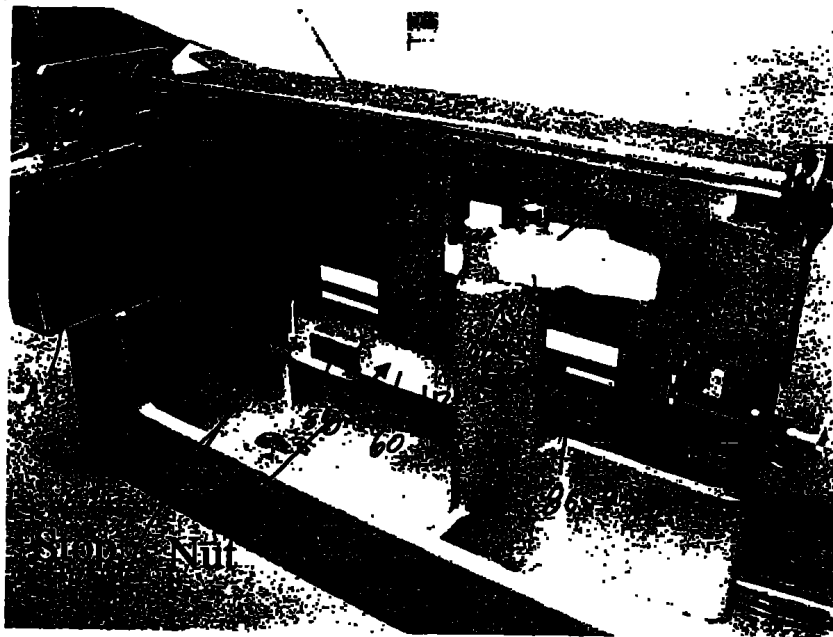
FIG. 23

105
49

607 47
105



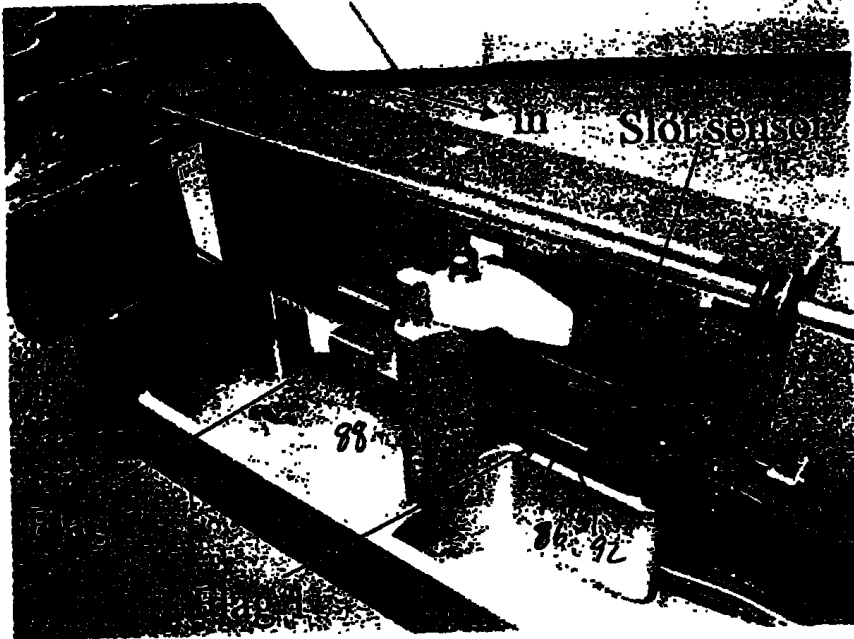
Insert Position: detail of slide 1



Nut on lead screw
touches a hard stop.

Fig 5

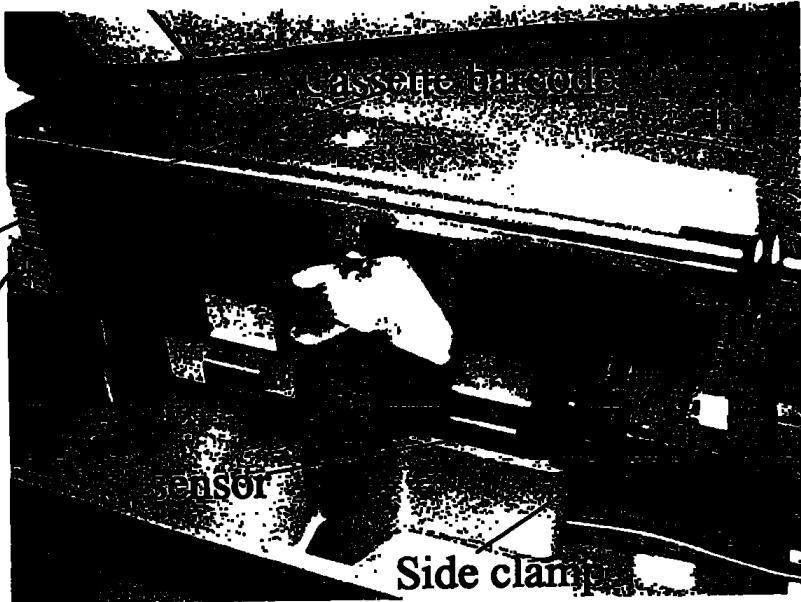
Barcode start



- Inserted cassette (not shown) pushes flag 1 of carriage to block beam of slot sensor, triggering stepper motor to move the carriage in while scan engine reads barcode on cassette.

Fig. 6

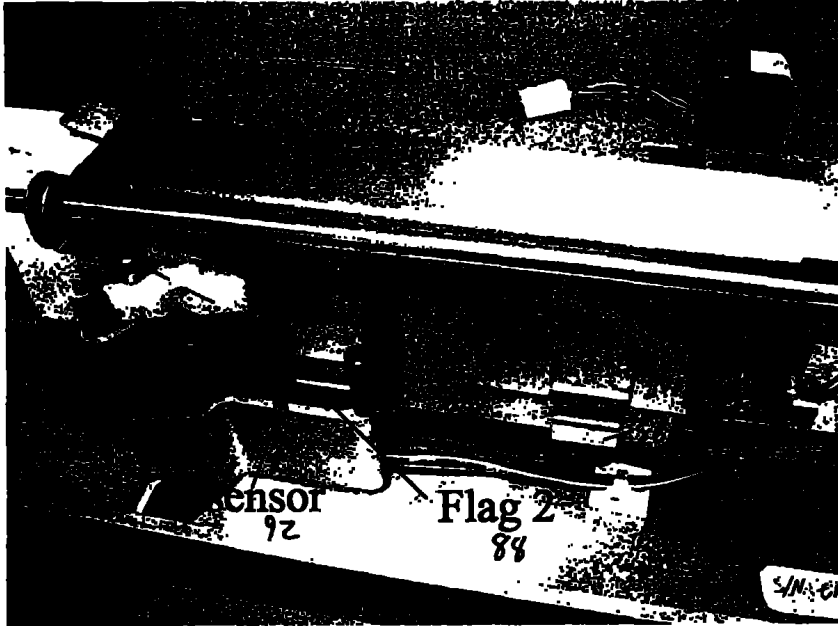
Barcode reading



- Cassette is being moved in while scan engine (not shown) reads barcode.
- Side clamp holds cassette fixed to carriage.

Fig 1

Home position



Trailing edge of
flag 2 just passes
slot sensor.

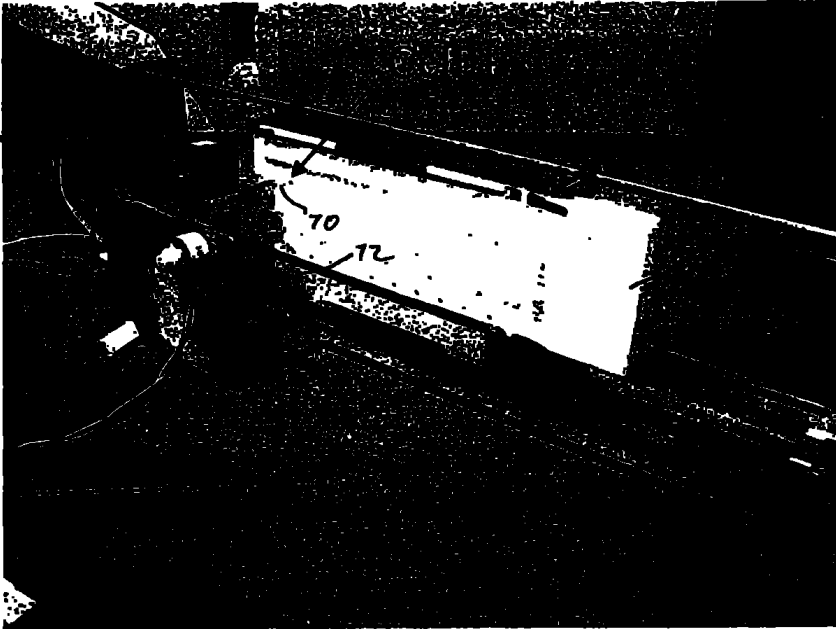
FIG. 7

8

11

12

Cell 1



- Stepper motor moves cassette in 5.55 mm from home to arrive at cell 1

16.9

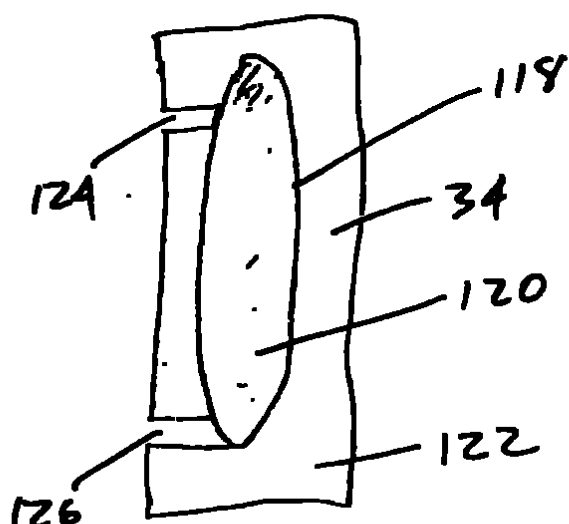
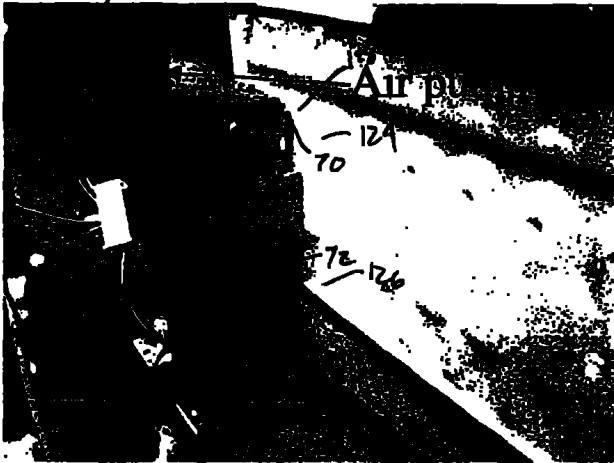


FIG. 10

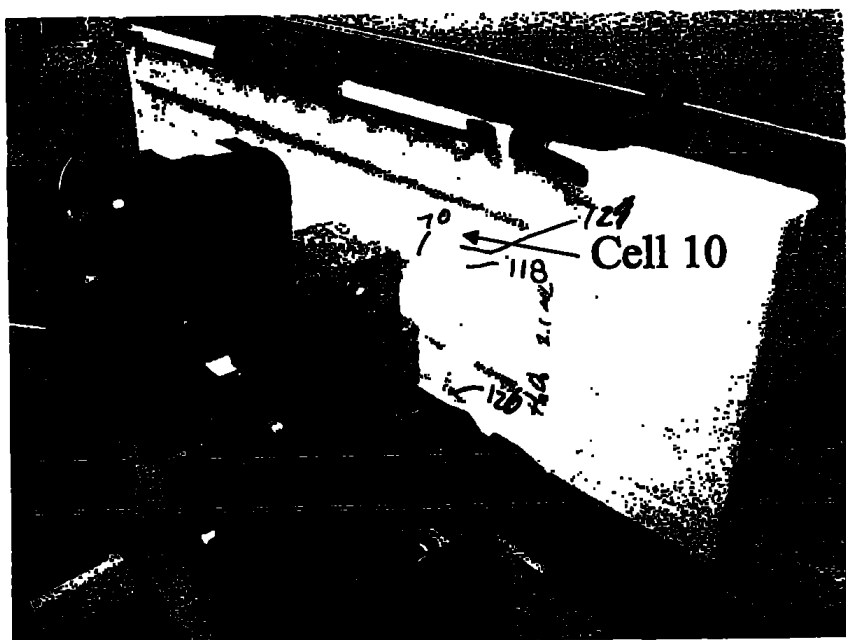
Cell 1: Injection



- Needles are inside cell 1
- Air pump pressurizes cell through top needle, forcing H_2O_2 out through the bottom needle and valve (not shown), and through tubing connected to vaporizer.
- Injection sequence as follows:
 - T=0 sec: needles fully extend
 - T=2 sec: Turn on air pump and open valve.
 - T=13 sec: turn off air pump
 - T=15 sec: close valve and start to retract needles.

FIG. 11

Cell 10



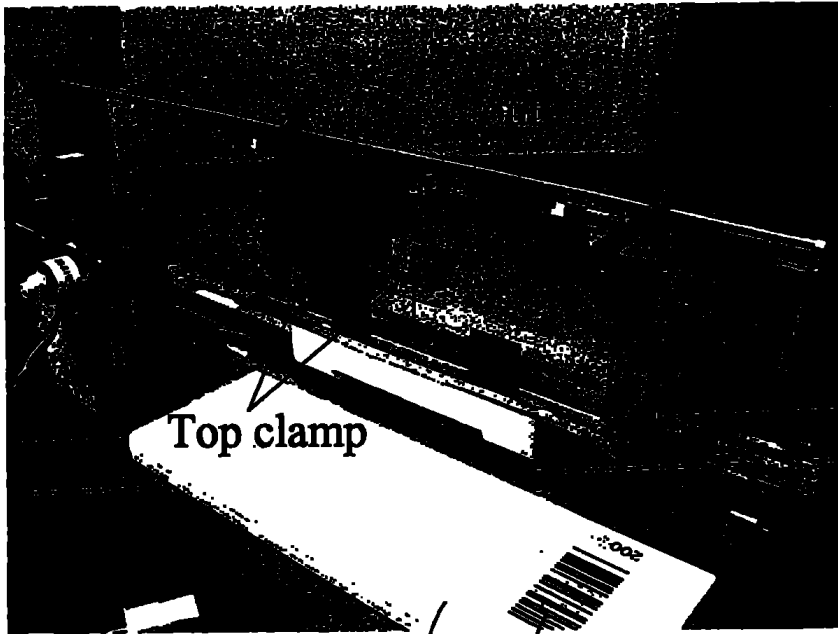
- Stepper motor moves cassette in 15 mm to arrive at the next cell.
- Once at a cell position, injection (described in page 11) takes place.
- The indexing and injection process repeat for all 10 cells.

FIG. 12

12

11
10

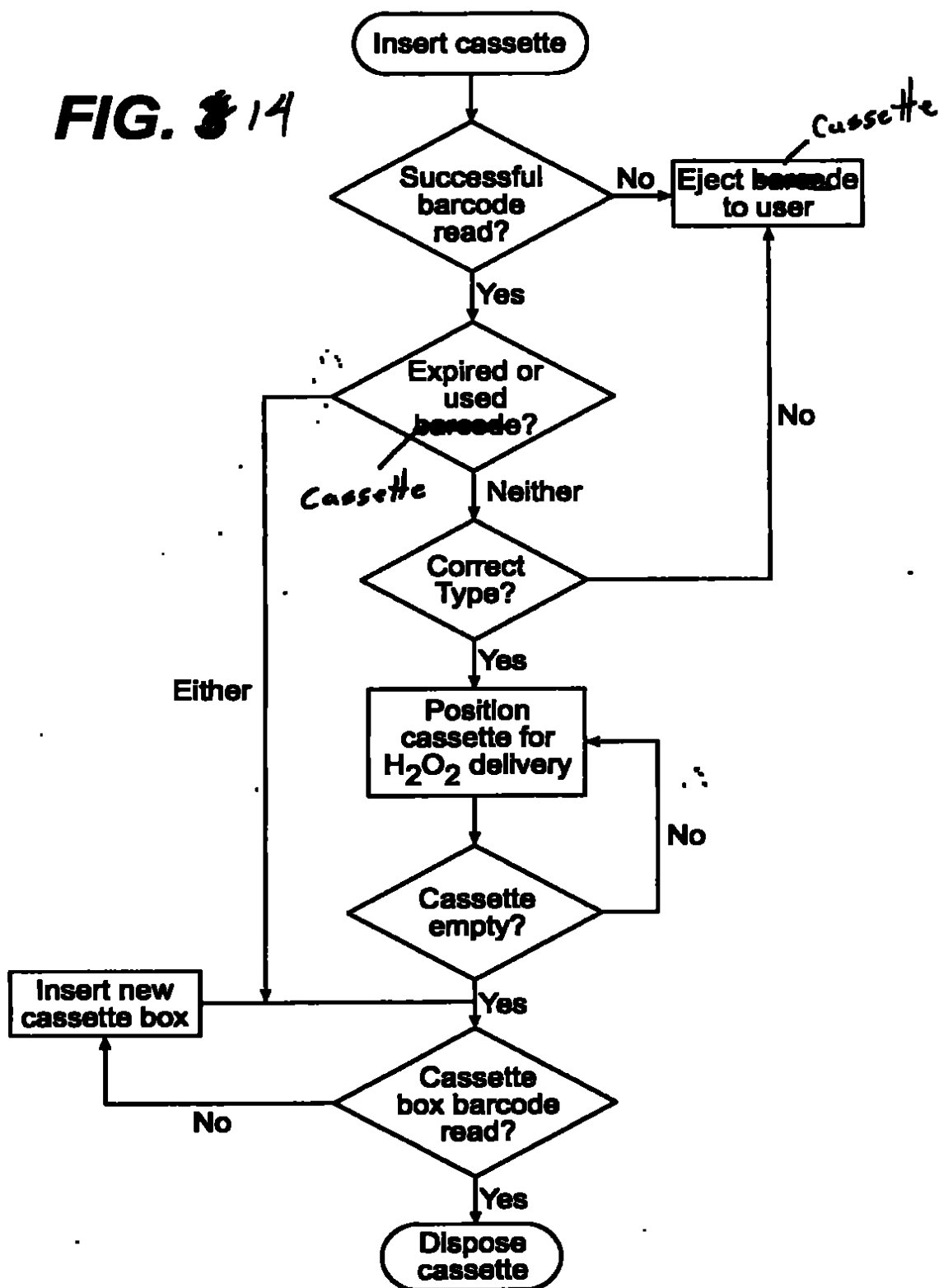
Cassette disposed



- As stepper motor moves carriage out, disposing cam (page 1) causes top clamp to rotate and pushes cassette away from carriage.
- Cassette falls into cassette collector box (not shown)

FIG. 3

FIG. 14



Insert Consumable

- Consumable embedded with RFID tag is inserted into STERRAD NX delivery assembly

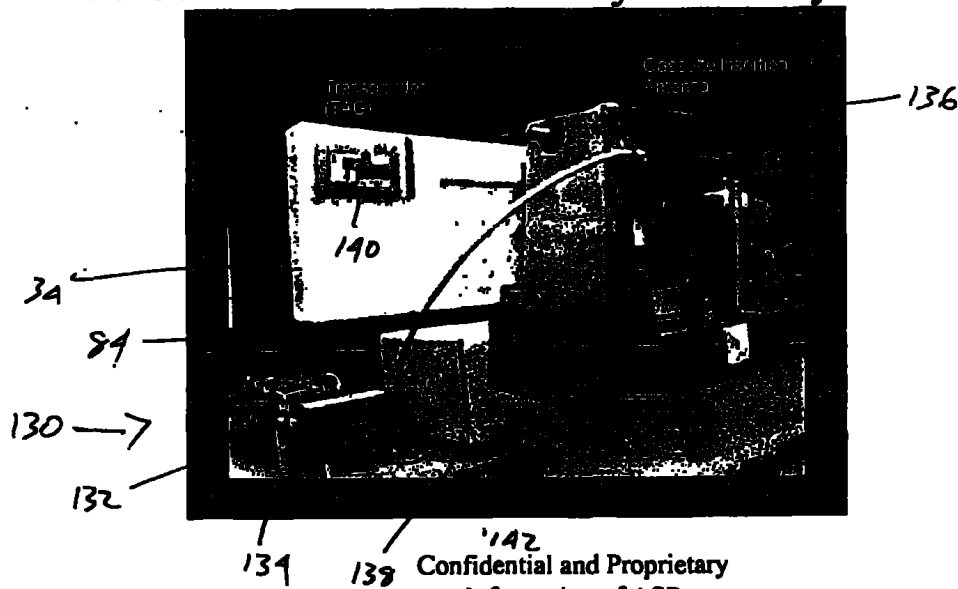


FIG. 15

Confidential and Proprietary
Information of ASP

10

118
88

RFID Transponder (Tag)

- RFID Tag RI -103 -112A is embedded on polymer film during consumable manufacturing and peroxide filling process.
- Supports ISO 15693-2, -3 standard
- Transponder memory map
 - 64 bit UID factory locked
 - 2048 bit user data memory

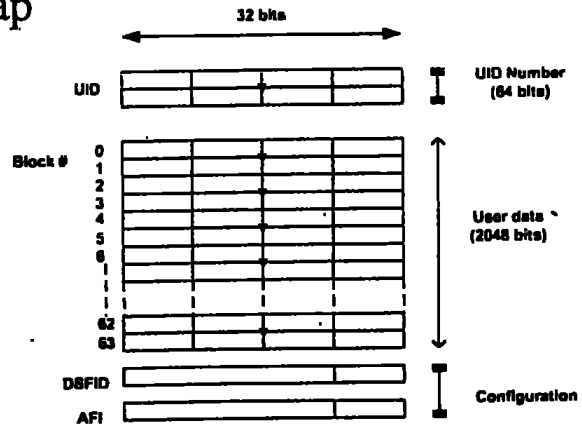
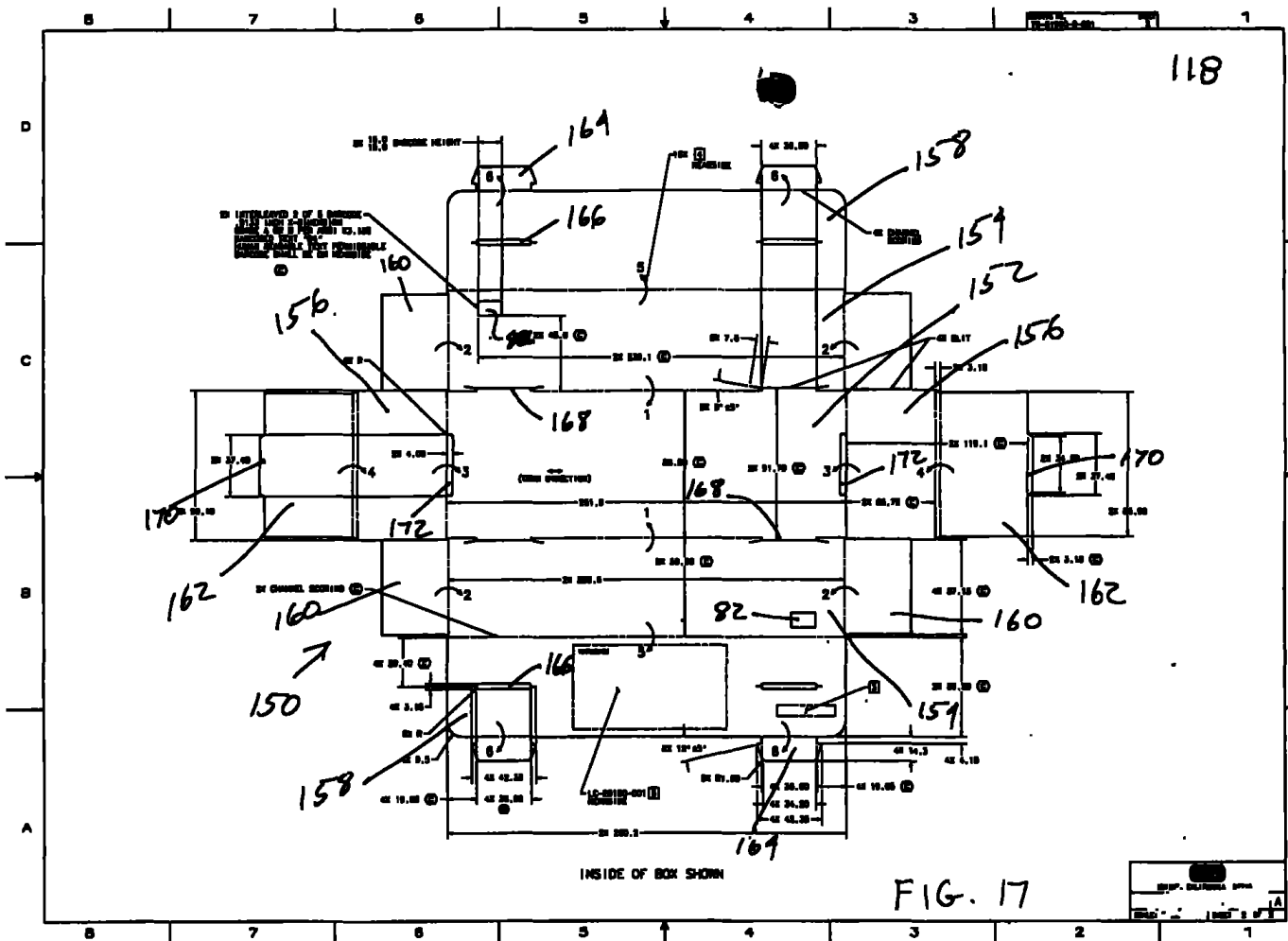


Fig 16

Confidential and Proprietary
Information of ASP

117 69



12x
119 6A

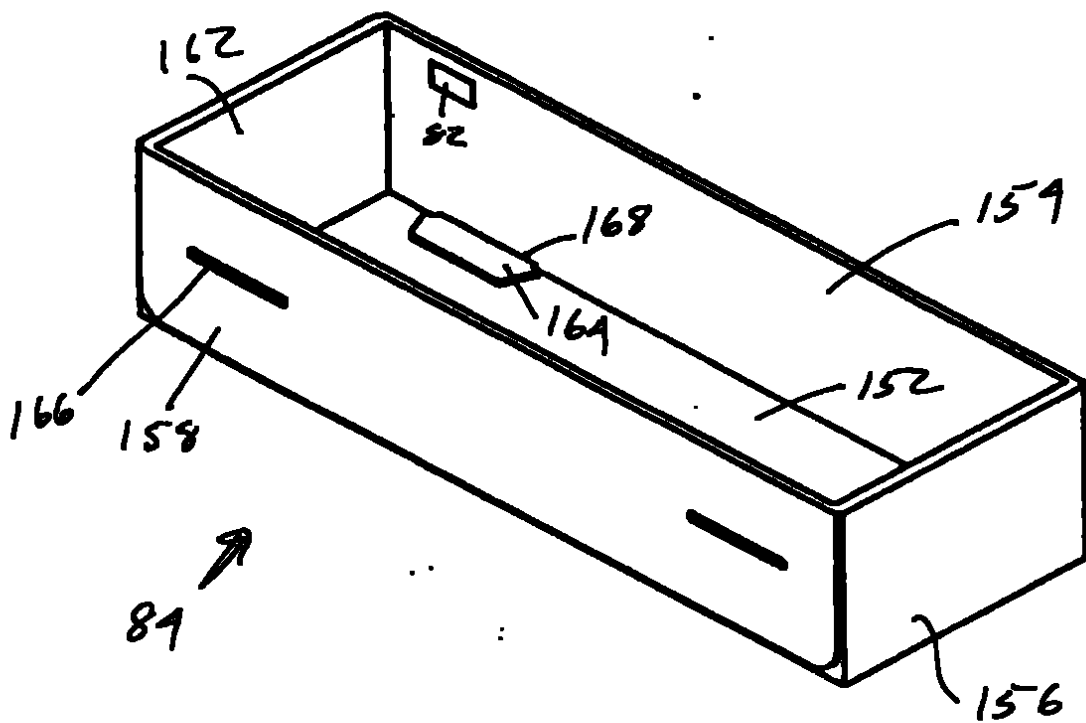


FIG. 18