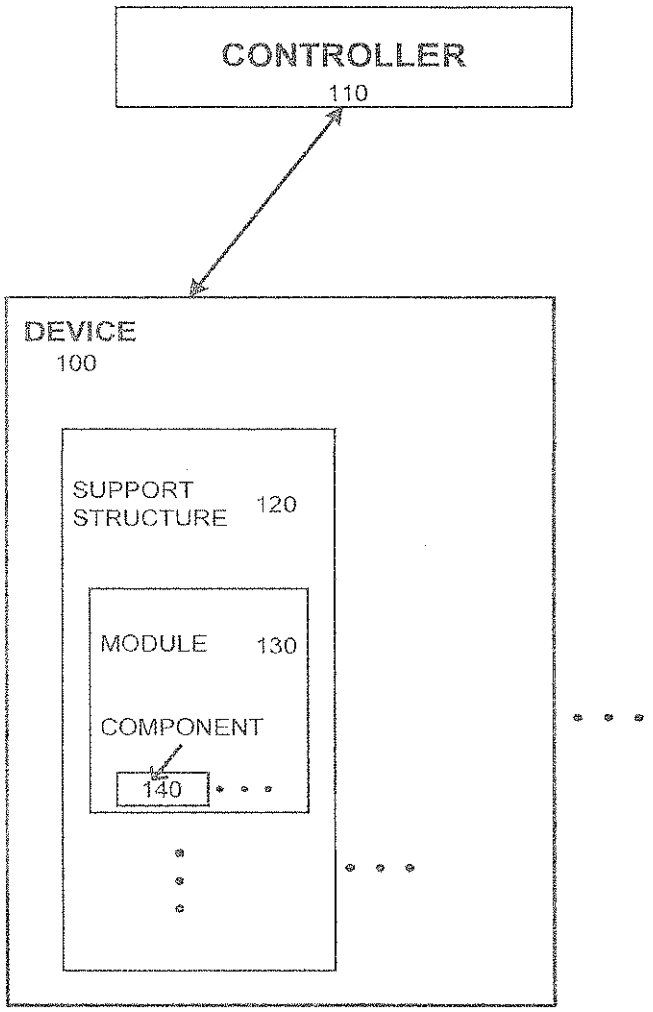

CONTROLLER
110
DEVICE
100
SUPPORT
STRUCTURE
120
MODULE
130
COMPONENT
140

FIG. 1

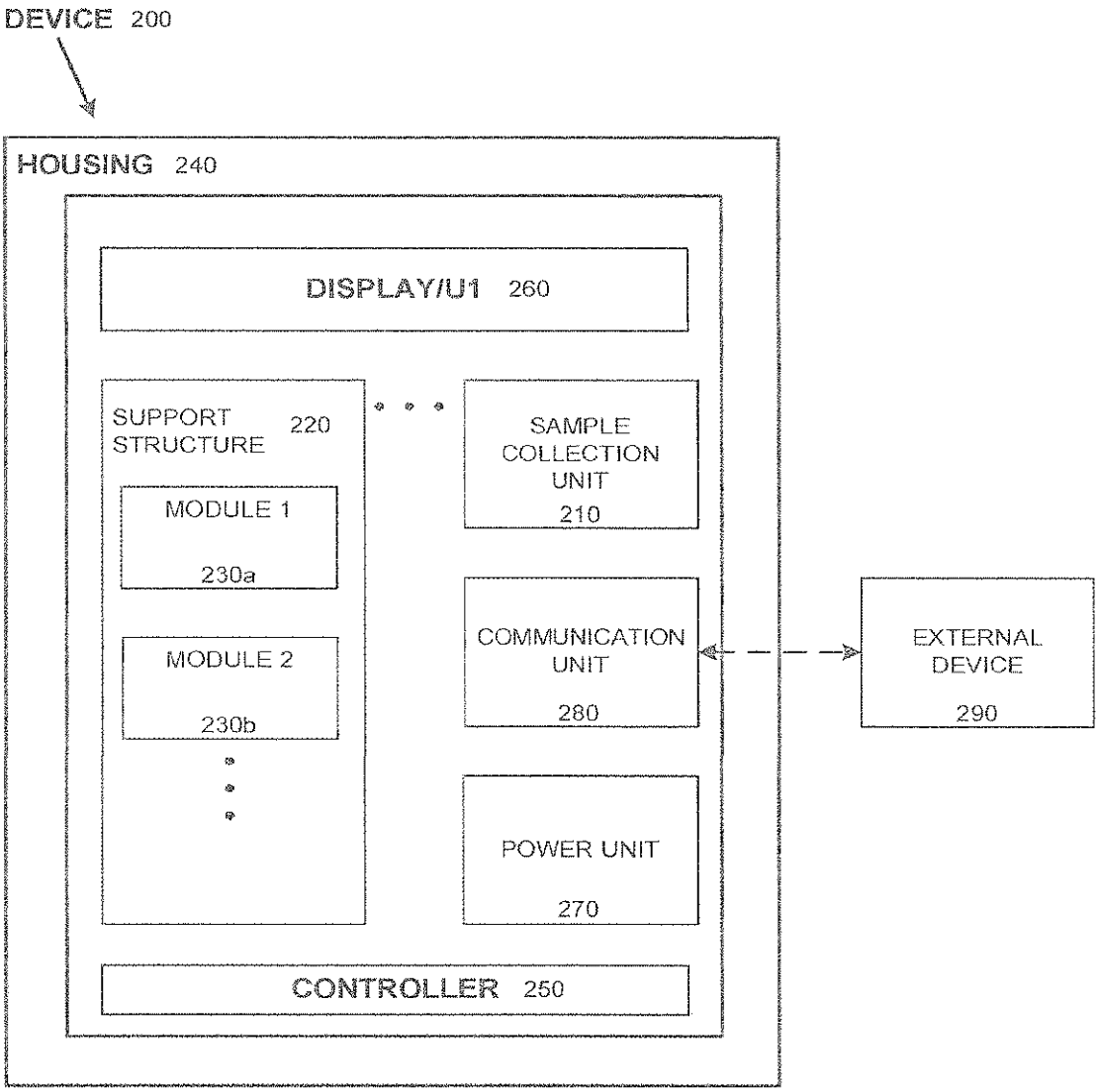

DEVICE 200
HOUSING 240
DISPLAY/UI 260
SUPPORT STRUCTURE 220
MODULE 1 230a
MODULE 2 230b
SAMPLE COLLECTION UNIT 210
COMMUNICATION UNIT 280
EXTERNAL DEVICE 290
POWER UNIT 270
CONTROLLER 250

FIG. 2

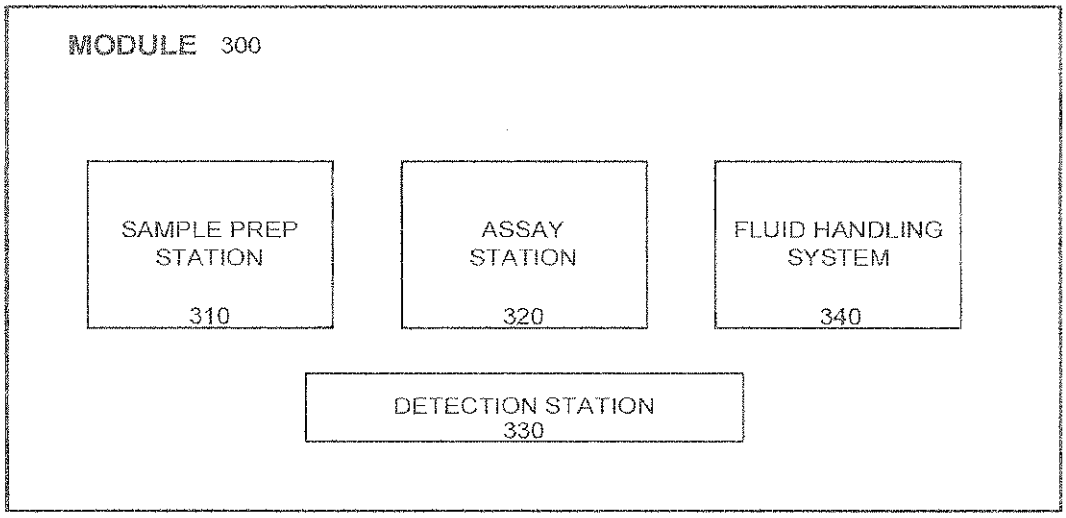

MODULE 300
SAMPLE PREP STATION 310
ASSAY STATION 320
FLUID HANDLING SYSTEM 340
DETECTION STATION 330

FIG. 3

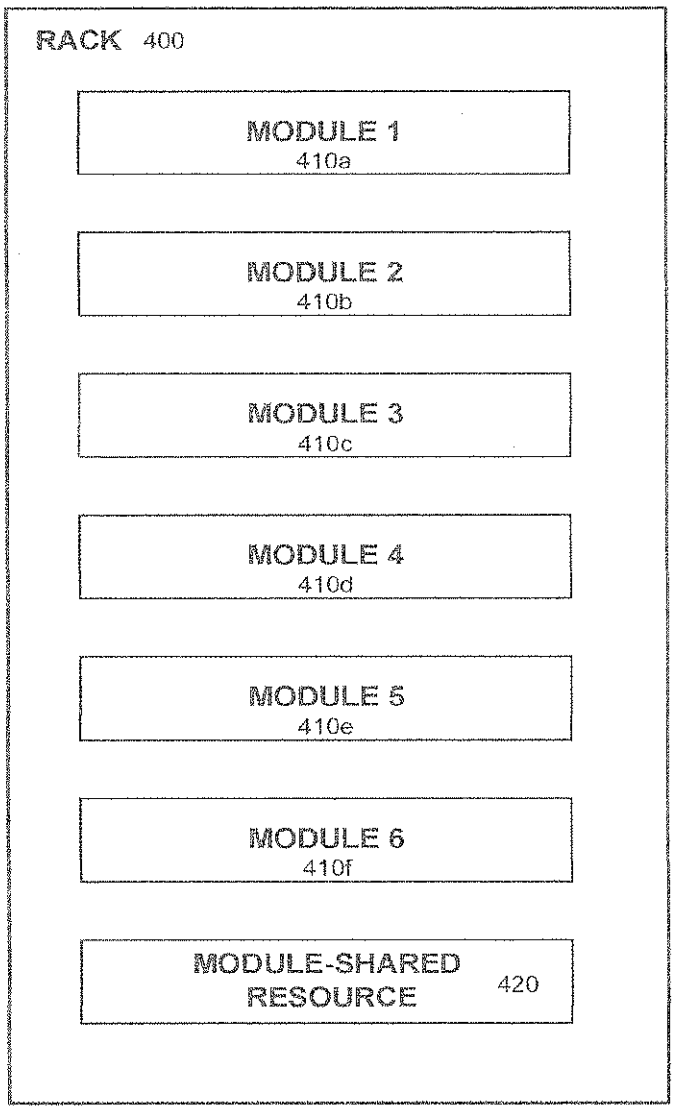

RACK 400
MODULE 1
410a
MODULE 2
410b
MODULE 3
410c
MODULE 4
410d
MODULE 5
410e
MODULE 6
410f
MODULE-SHARED RESOURCE
420

FIG. 4

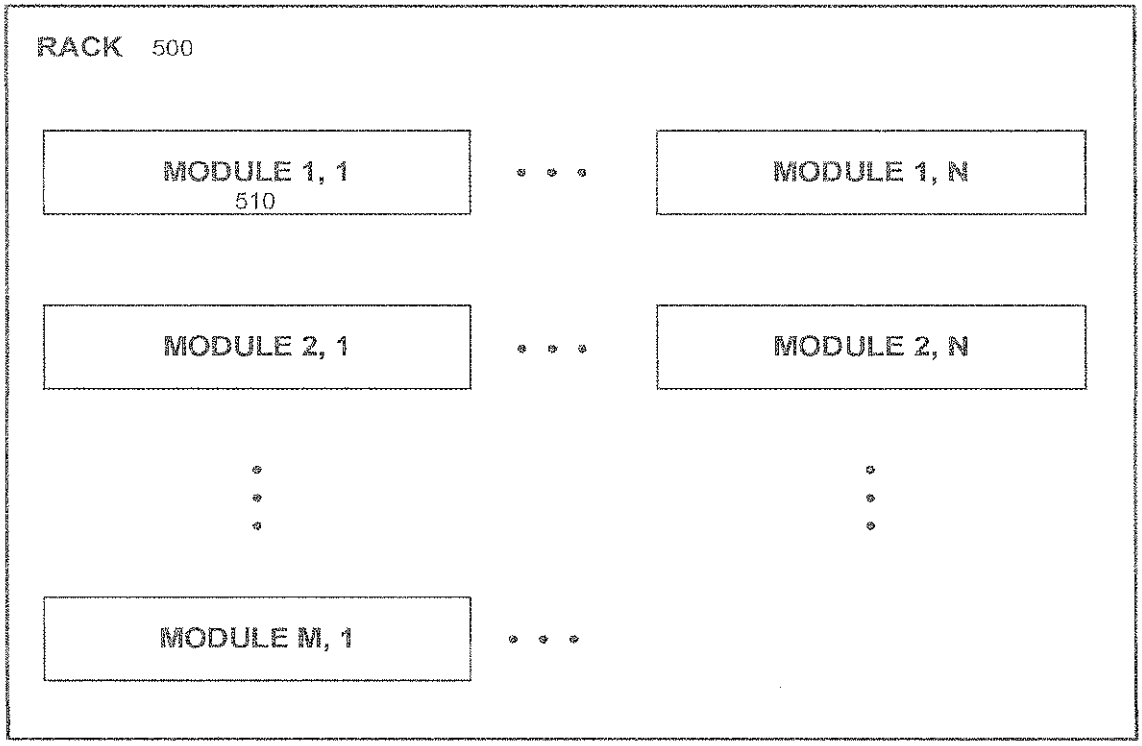
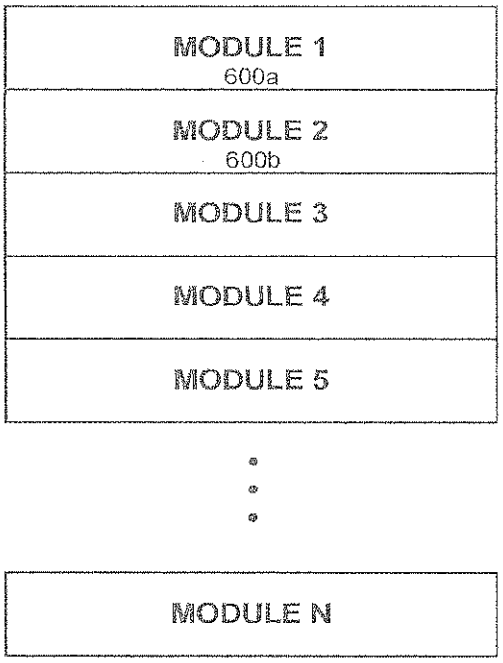

RACK 500
MODULE 1, 1
510
MODULE 1, N
MODULE 2, 1
MODULE 2, N
MODULE M, 1

FIG. 5



vertical stack
no-rack config

FIG. 6

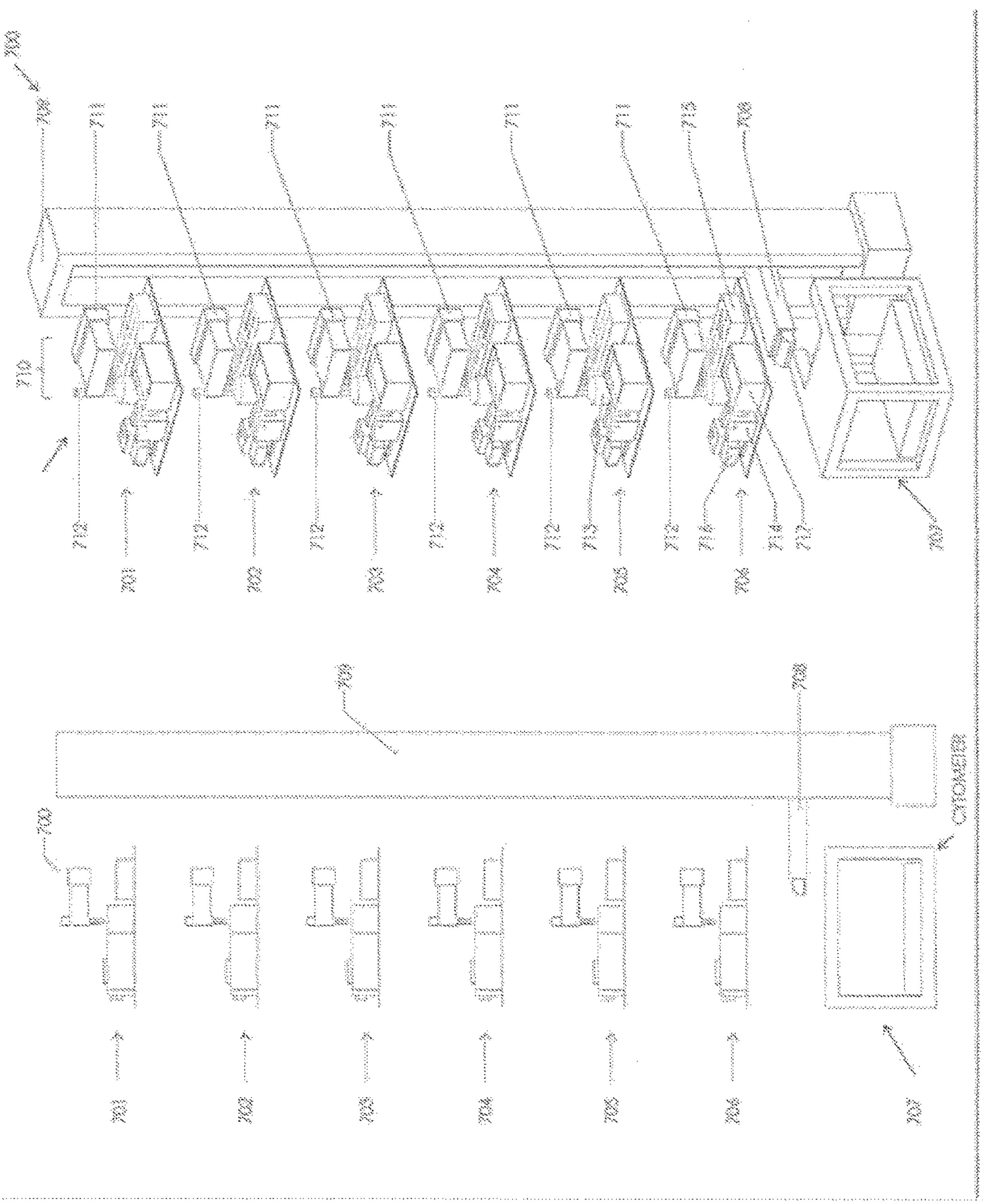
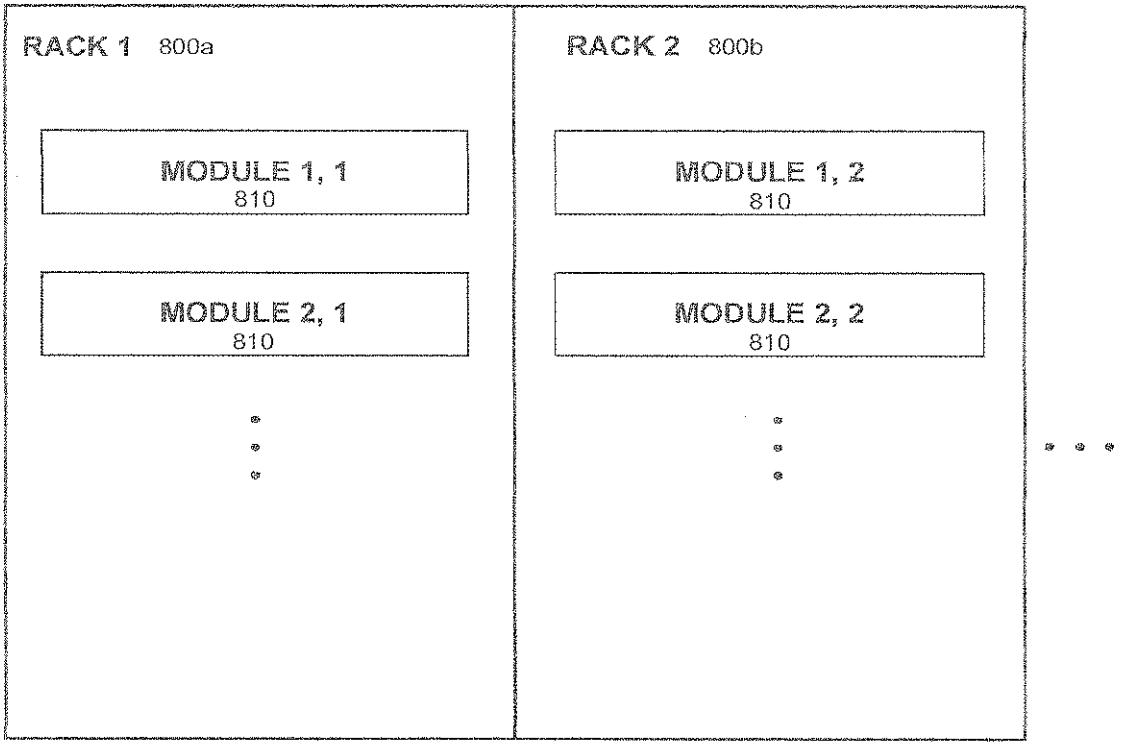

700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
717
CYTOMETER

FIG. 7



multi-rack

FIG 8

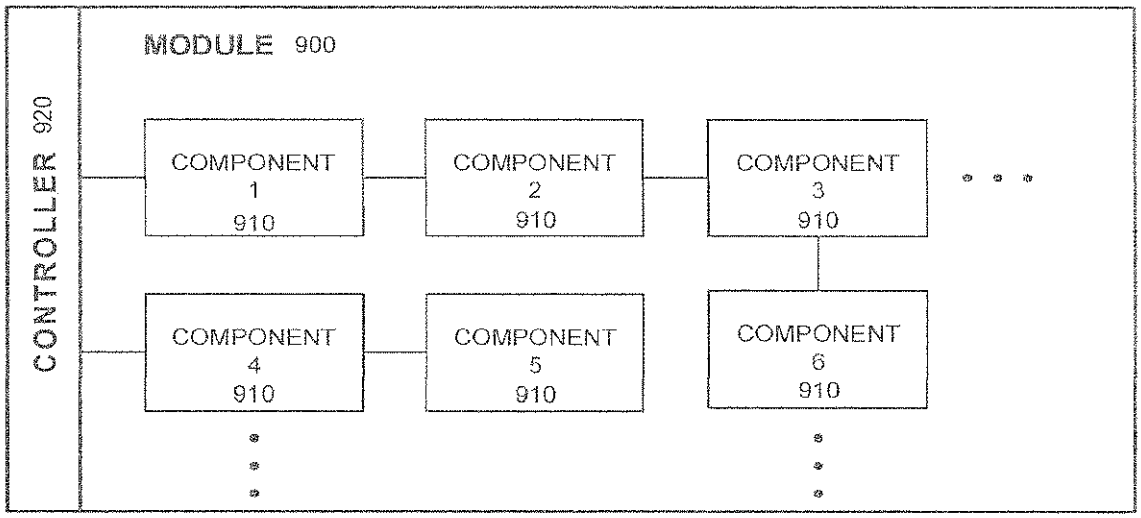

CONTROLLER 920
MODULE 900
COMPONENT 1 910
COMPONENT 2 910
COMPONENT 3 910
COMPONENT 4 910
COMPONENT 5 910
COMPONENT 6 910

FIG. 9

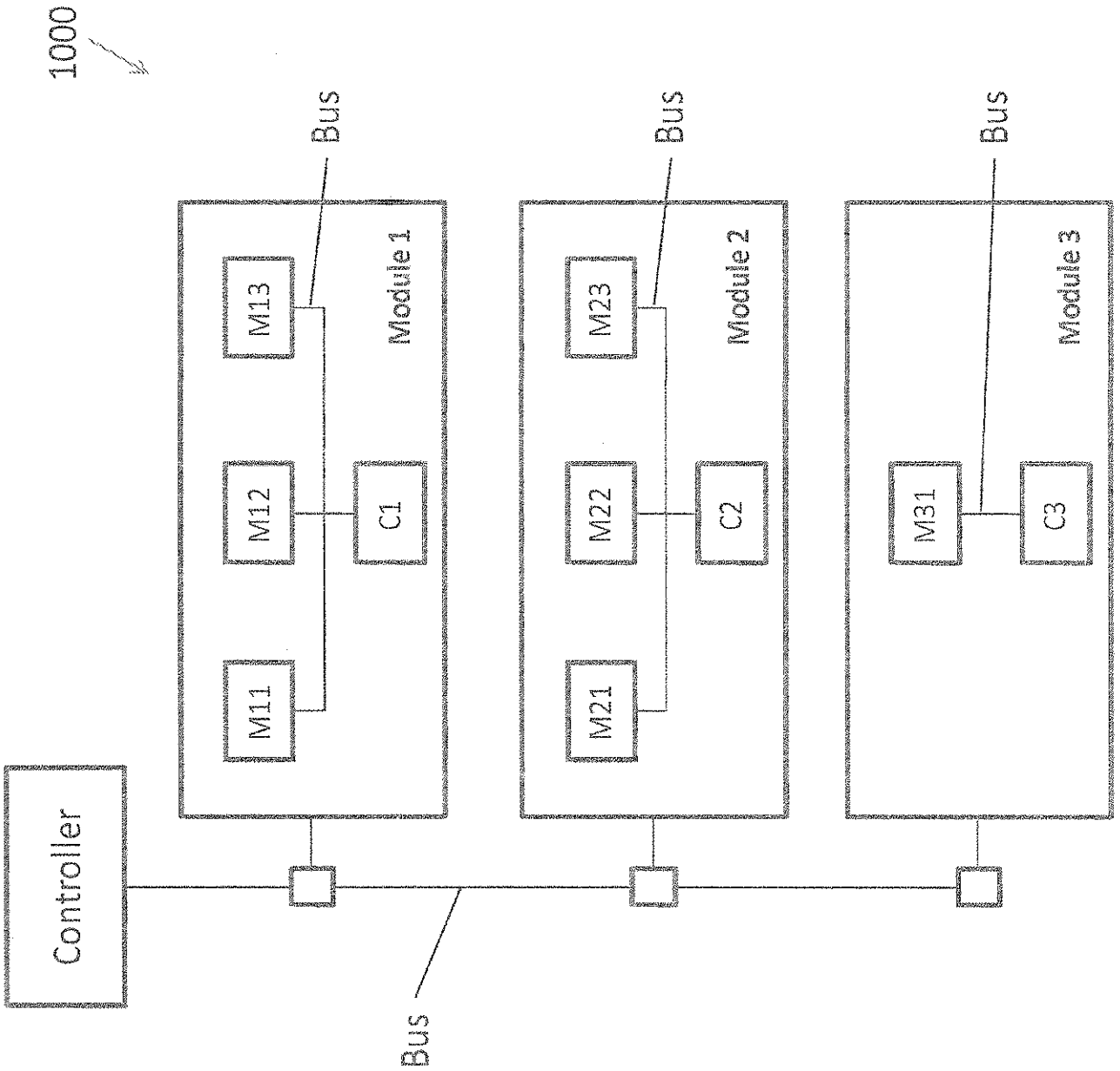

1000
Controller
Bus
Bus
Module 1
M11
M12
M13
C1
Module 2
M21
M22
M23
C2
Module 3
M31
C3
Bus
Bus

FIG. 10

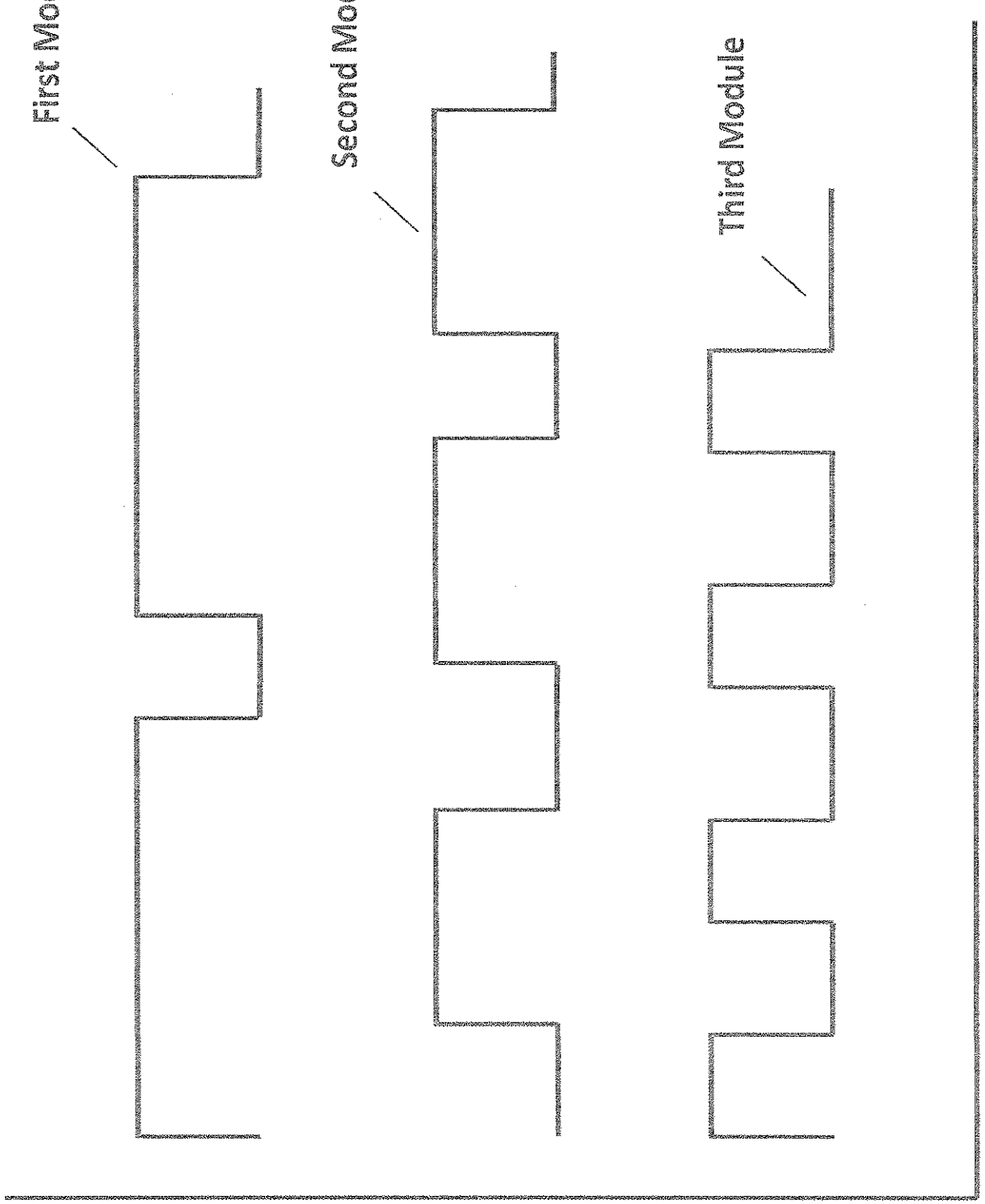


FIG. 11

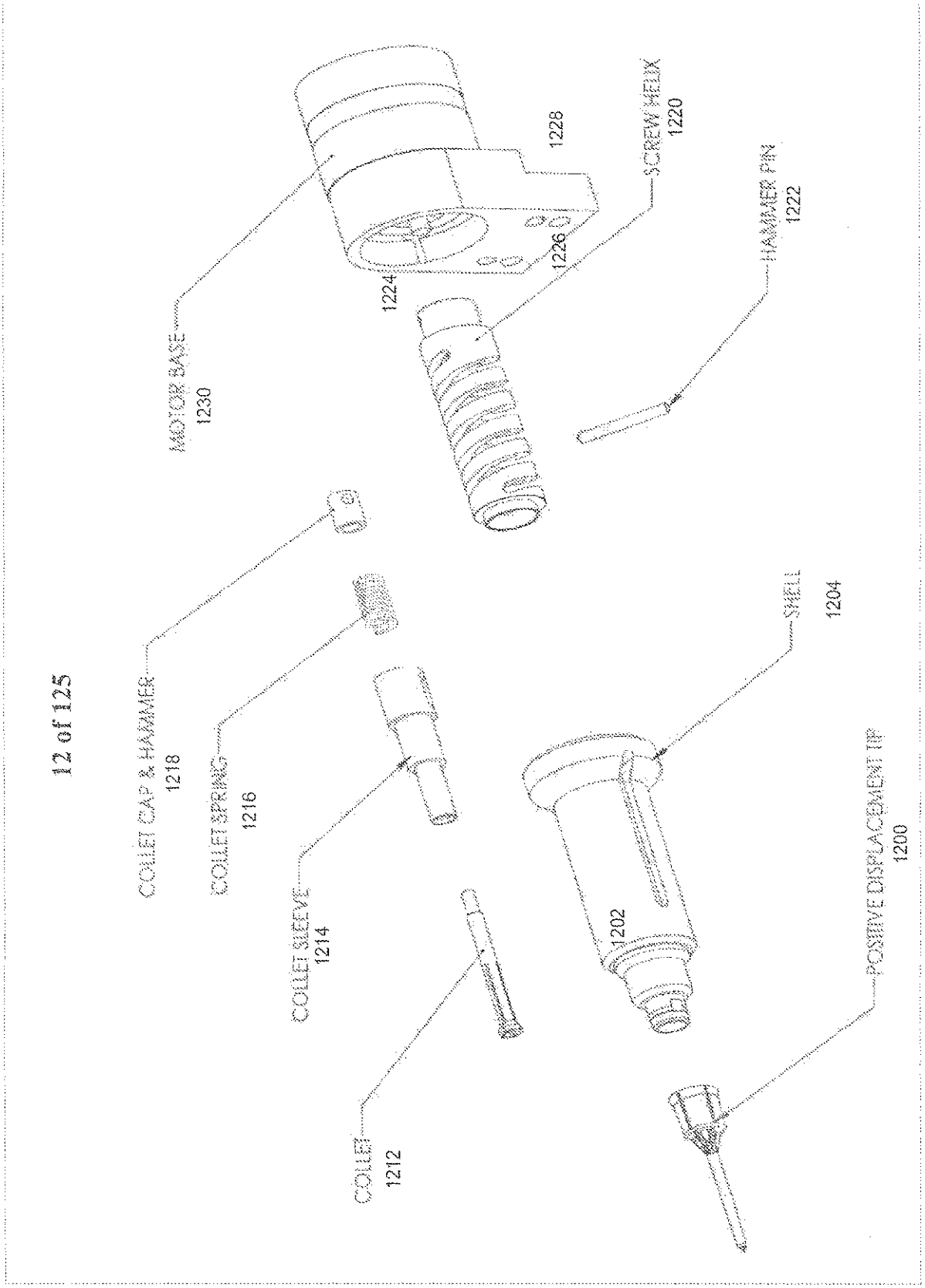

MOTOR BASE
1230
1228
1224
1226
SCREW HELIX
1220
HAMMER PIN
1222
COLLET CAP & HAMMER
1218
COLLET SPRING
1216
COLLET SLEEVE
1214
COLLET
1212
1202
SHELL
1204
POSITIVE DISPLACEMENT TIP
1200

FIG. 12

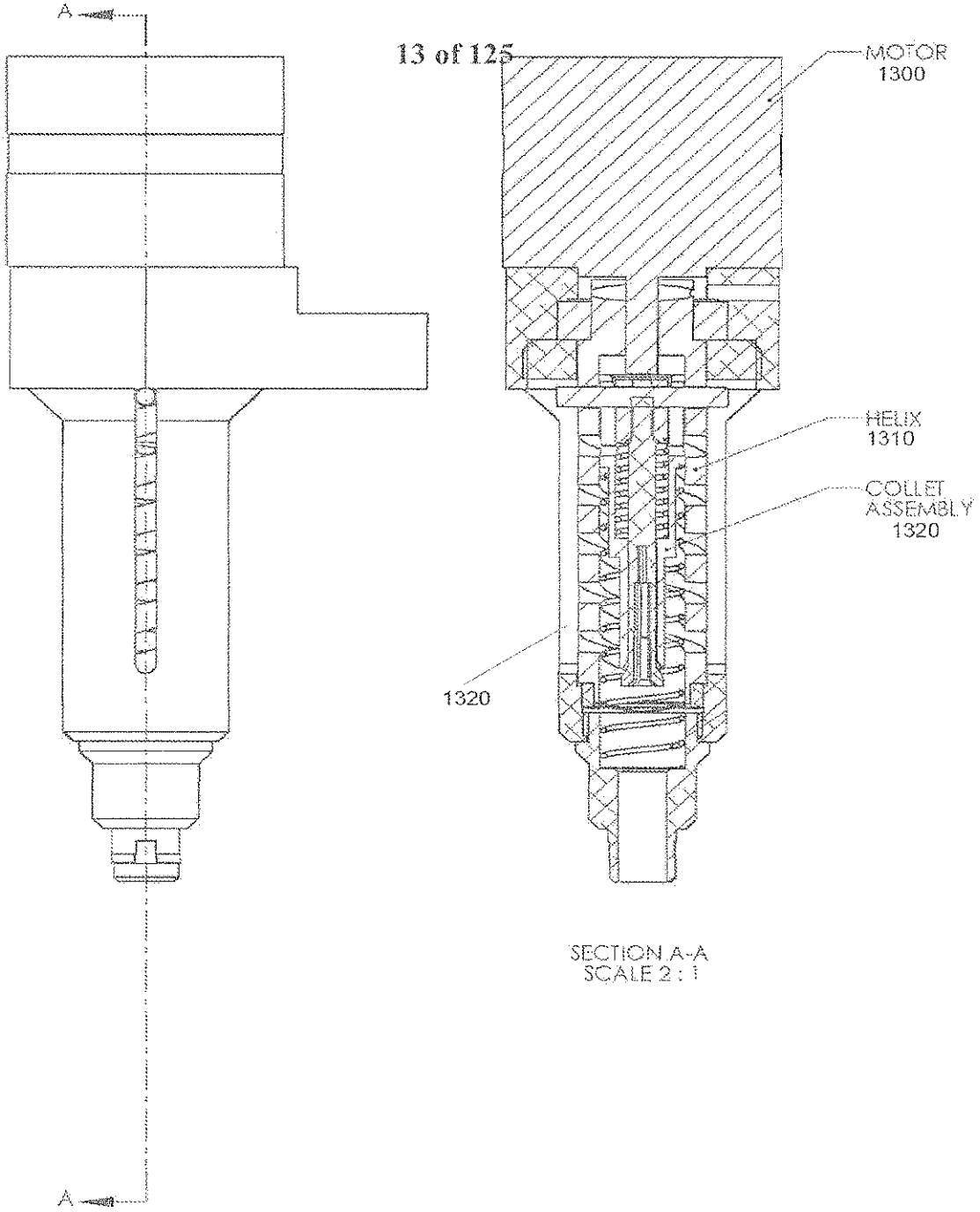

A
A
MOTOR
1300
HELIX
1310
COLLET
ASSEMBLY
1320
1320
SECTION A-A
SCALE 2 : 1

FIG. 13

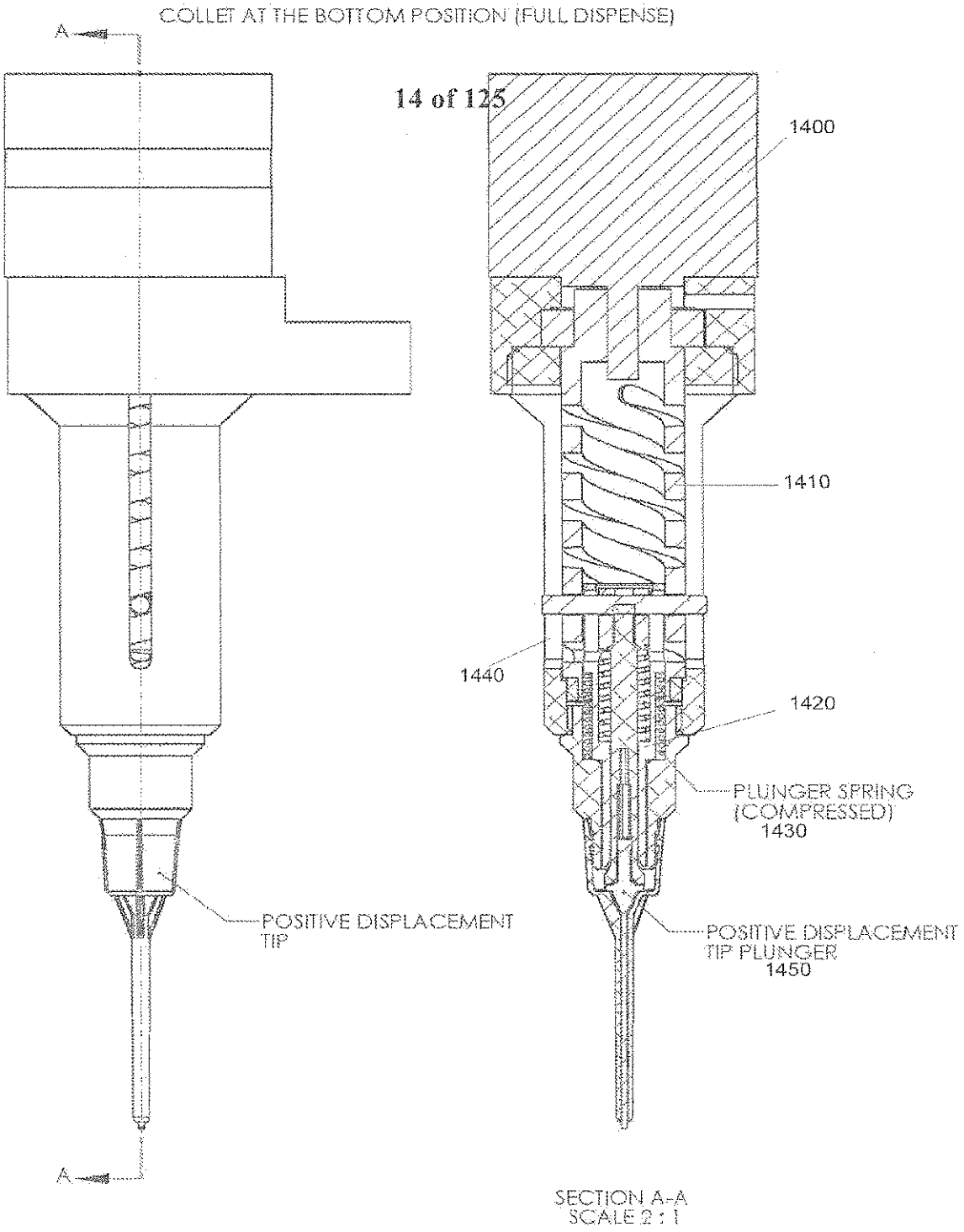

COLLET AT THE BOTTOM POSITION (FULL DISPENSE)
A
A
1400
1410
1440
1420
PLUNGER SPRING
(COMPRESSED)
1430
POSITIVE DISPLACEMENT
TIP
POSITIVE DISPLACEMENT
TIP PLUNGER
1450
SECTION A-A
SCALE 2 : 1

FIG. 14

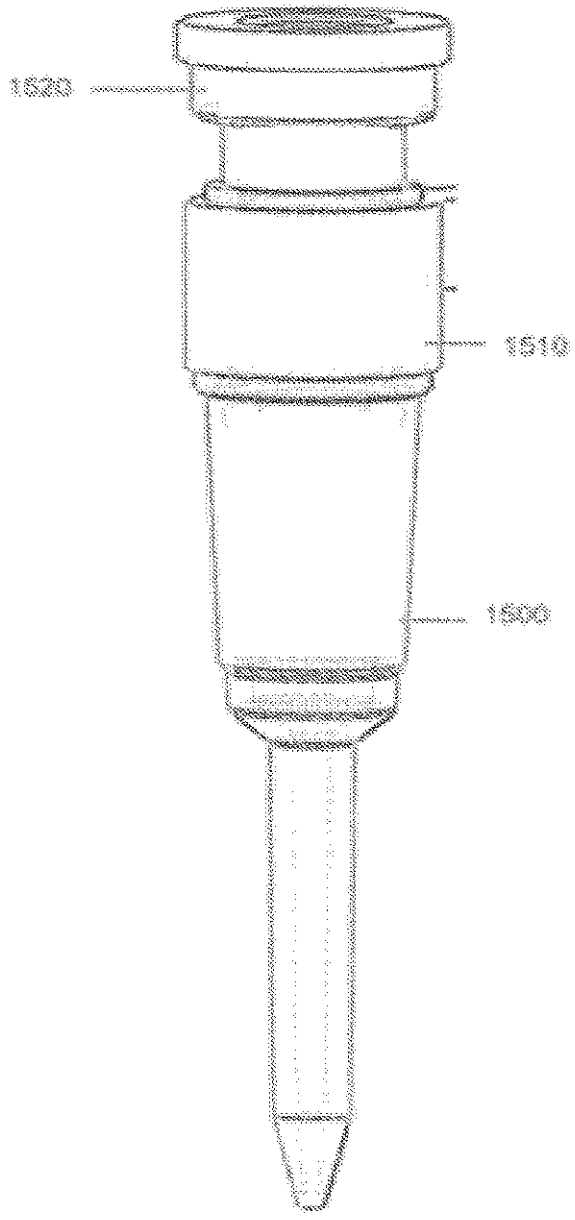


FIG. 15

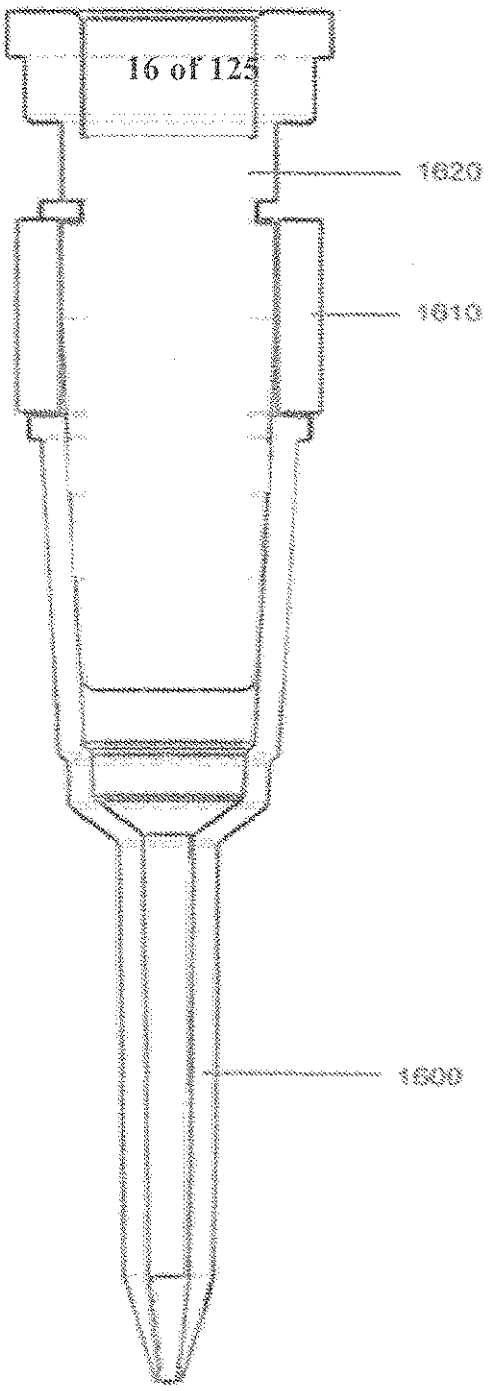


FIG. 16

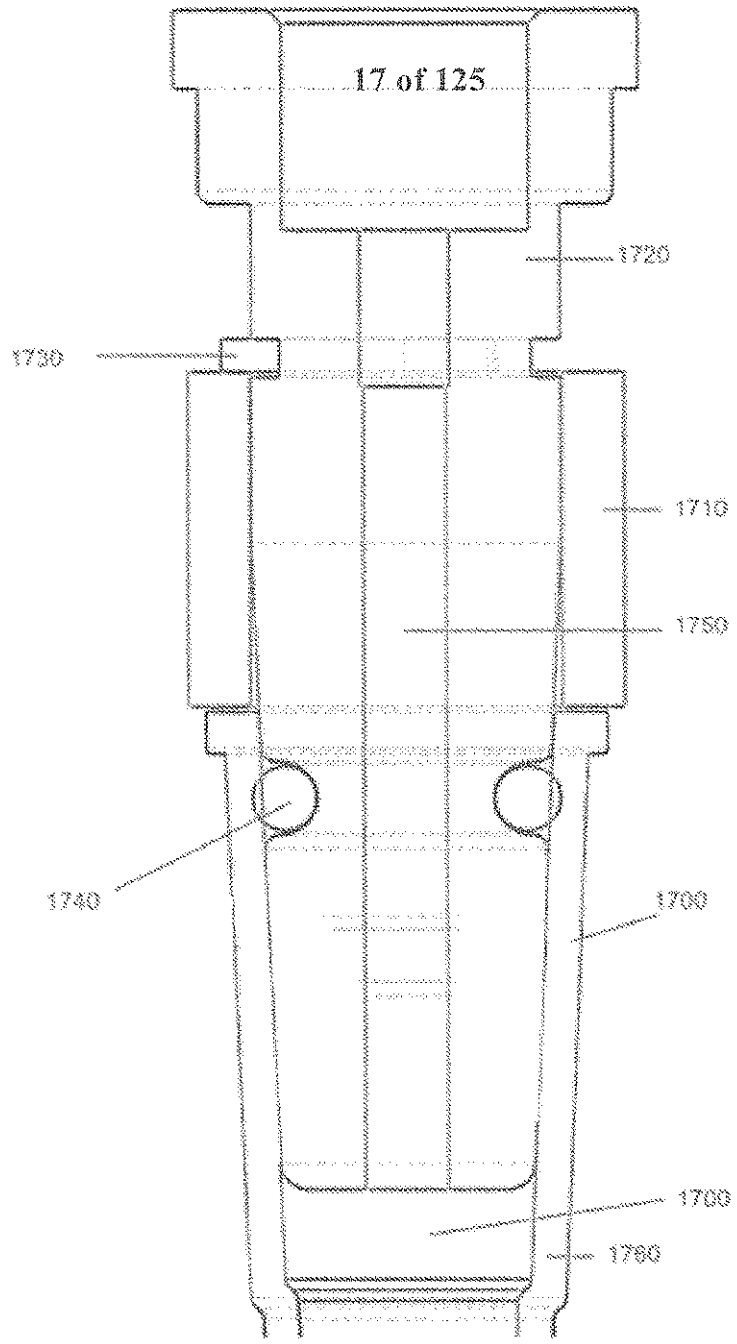


FIG. 17

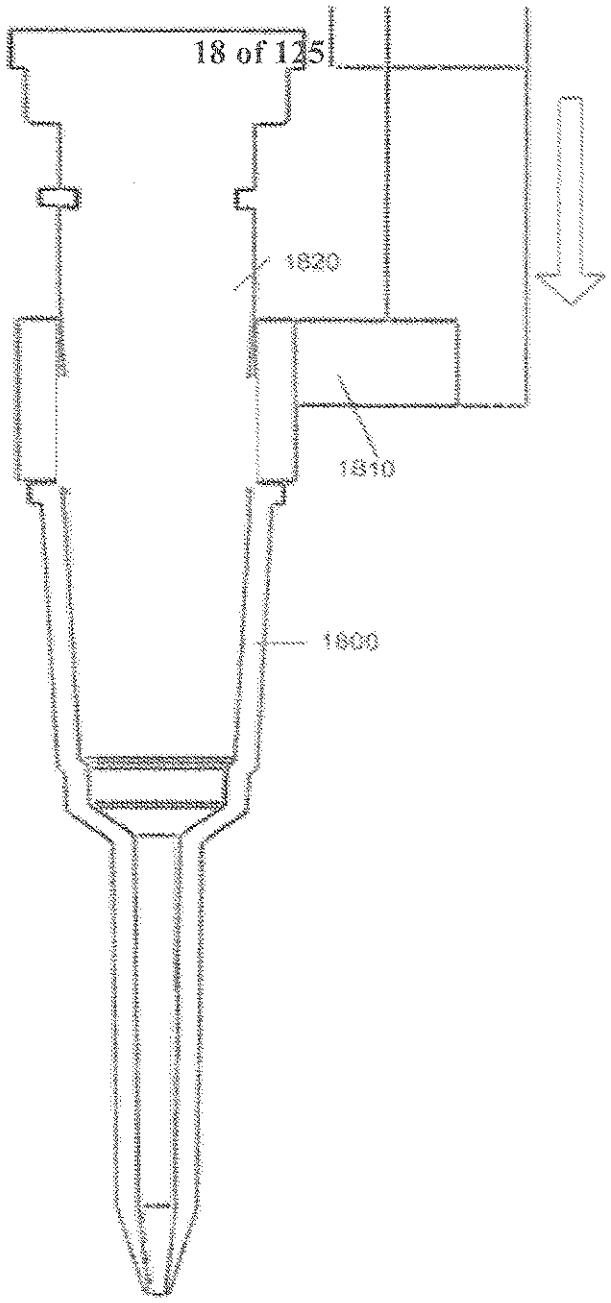


FIG. 18

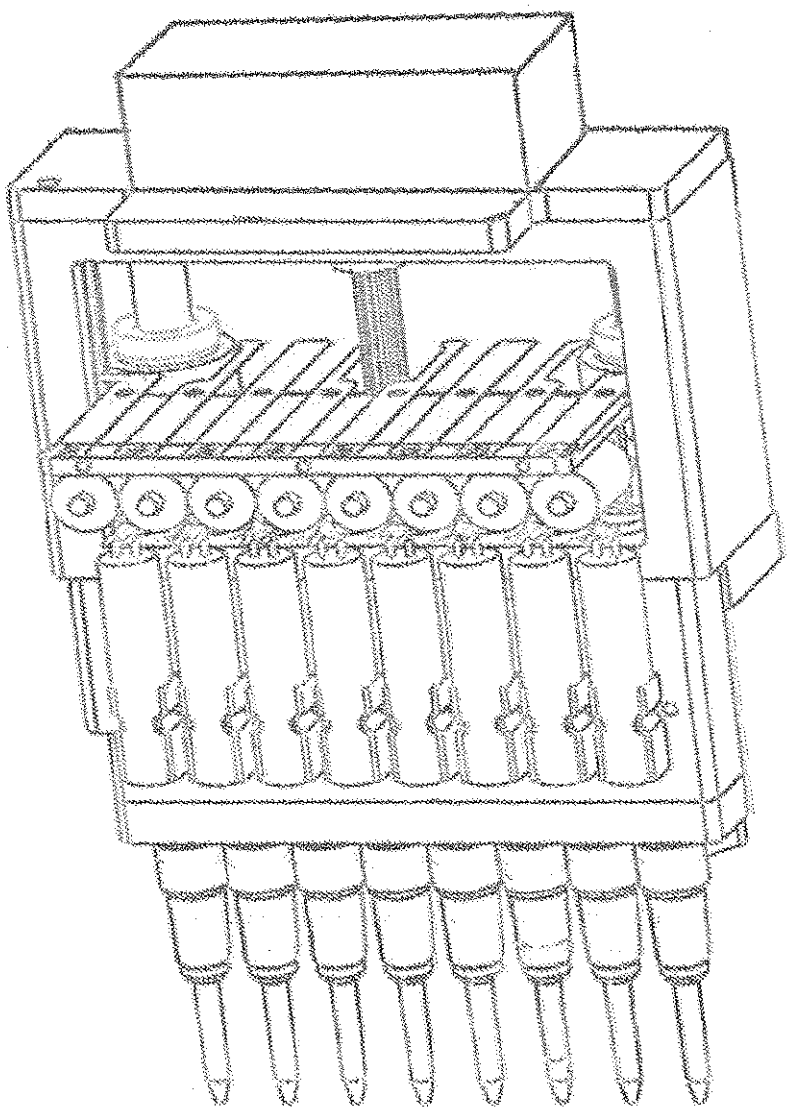


FIG. 19A

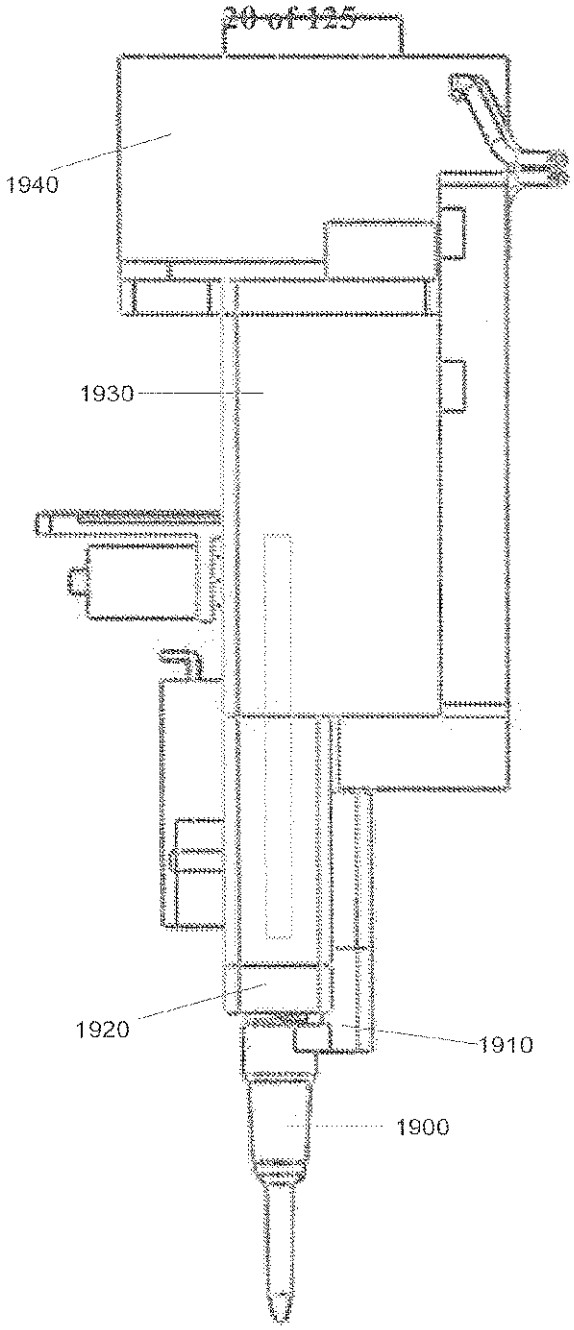


FIG. 19B

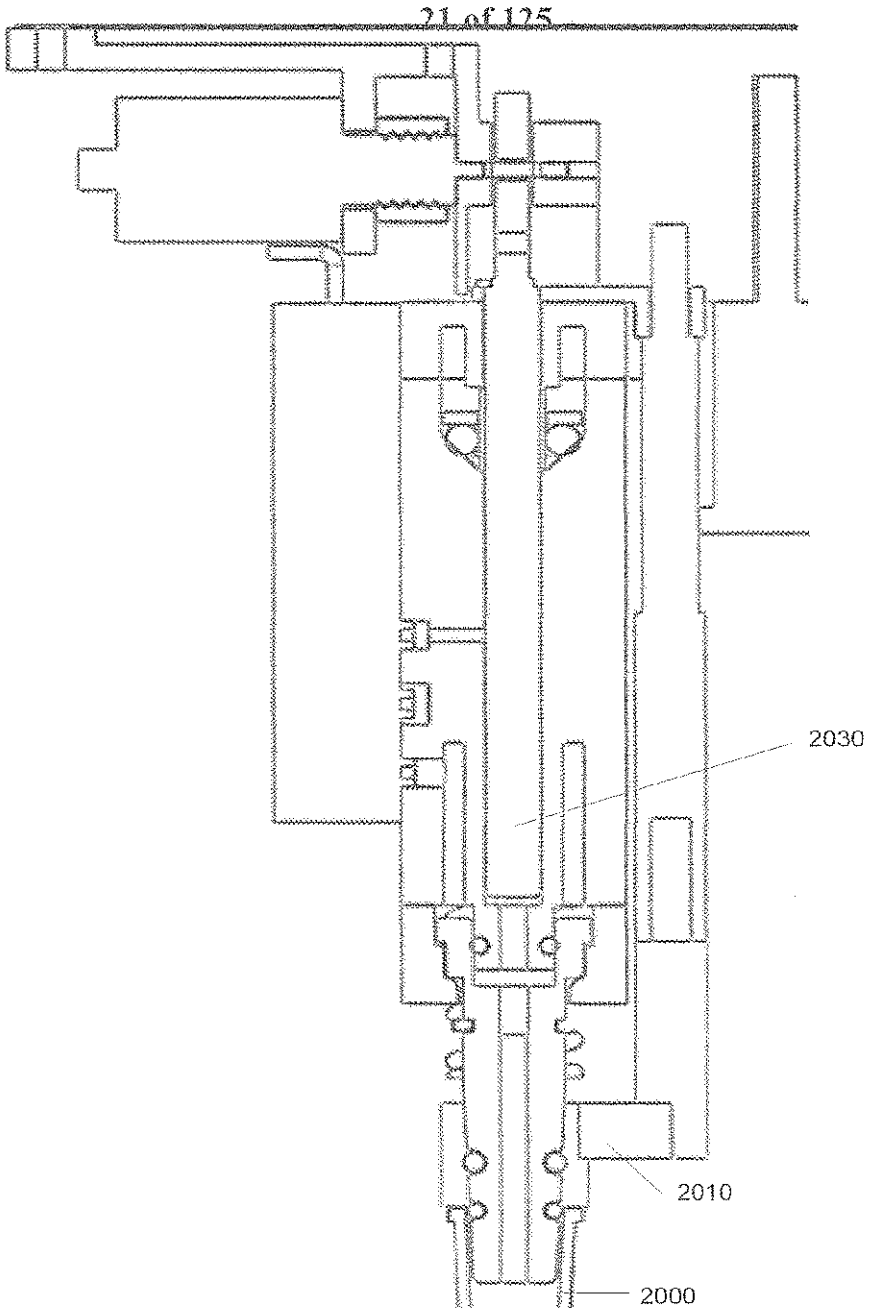


FIG. 20A

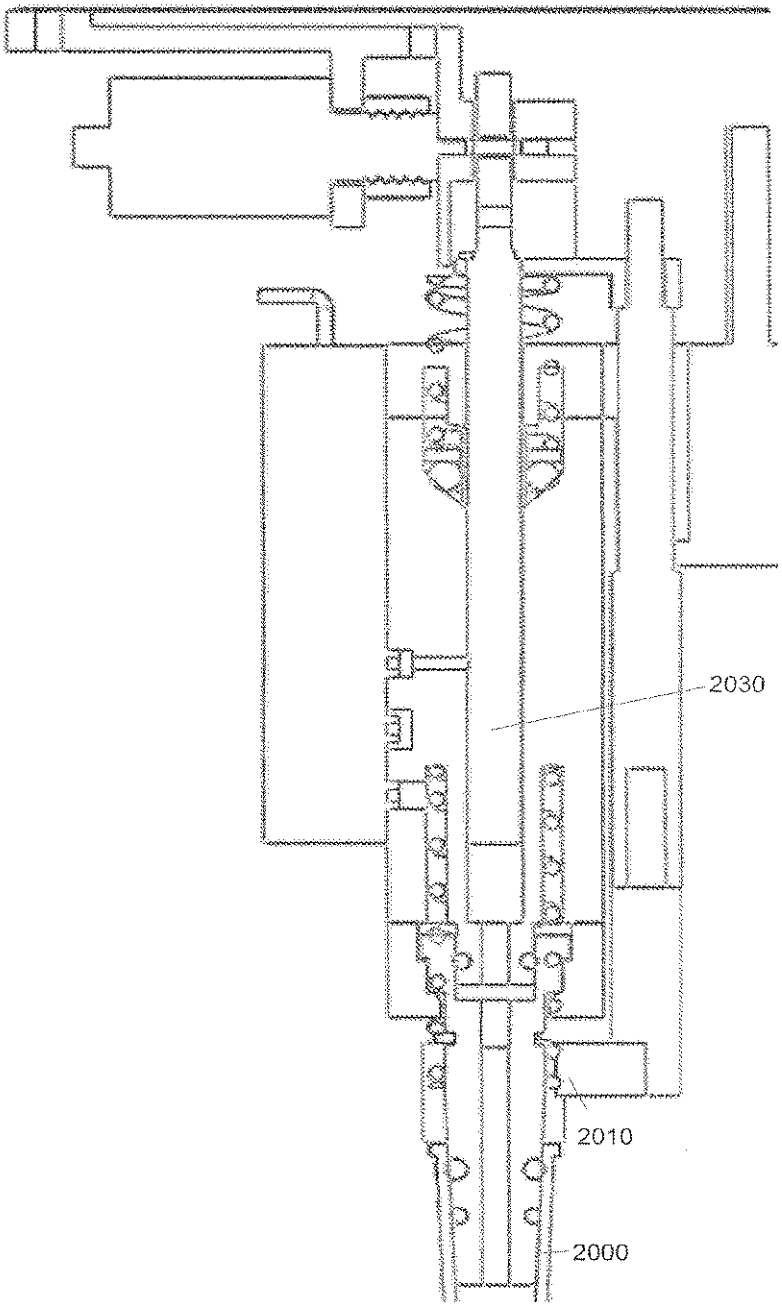


FIG. 20B

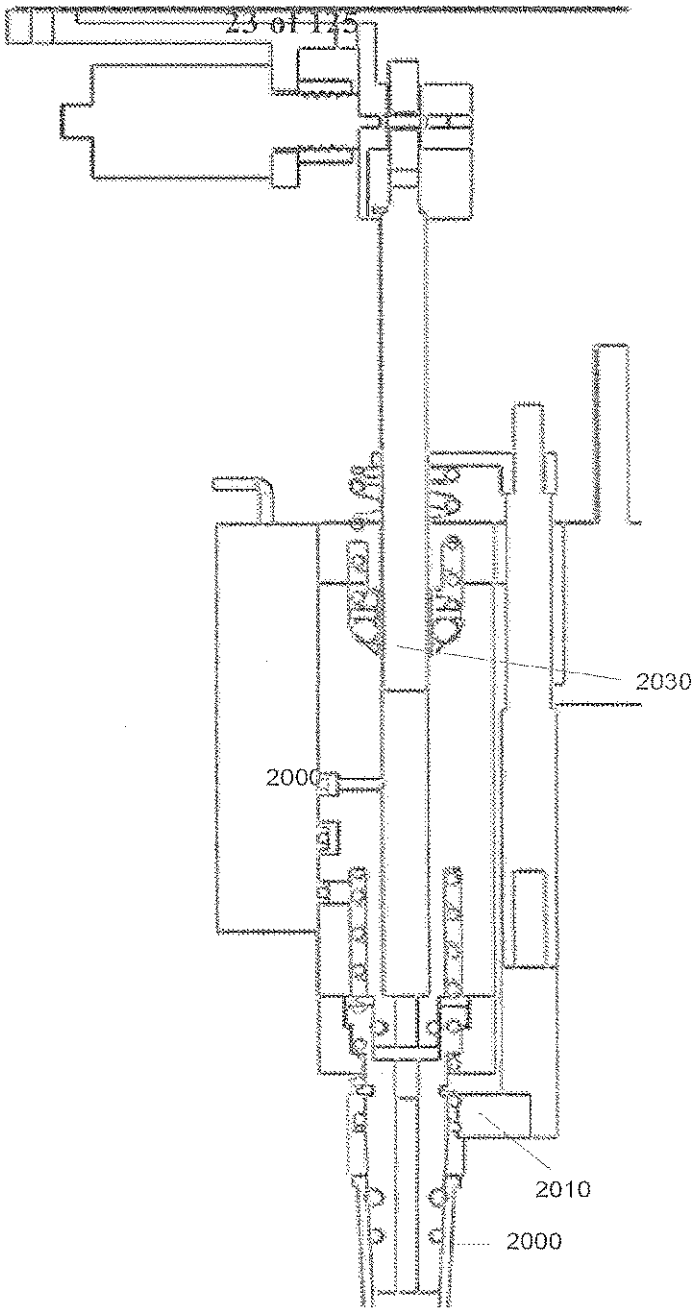
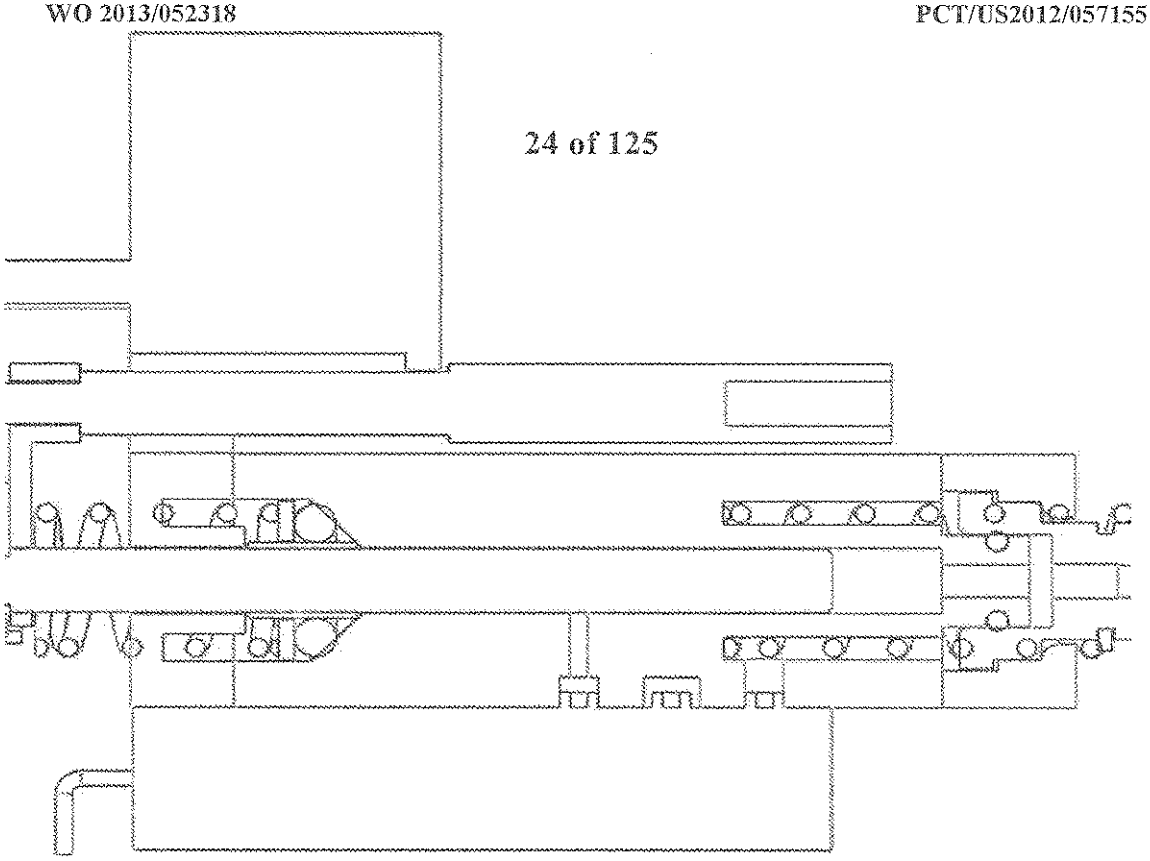


FIG. 20C



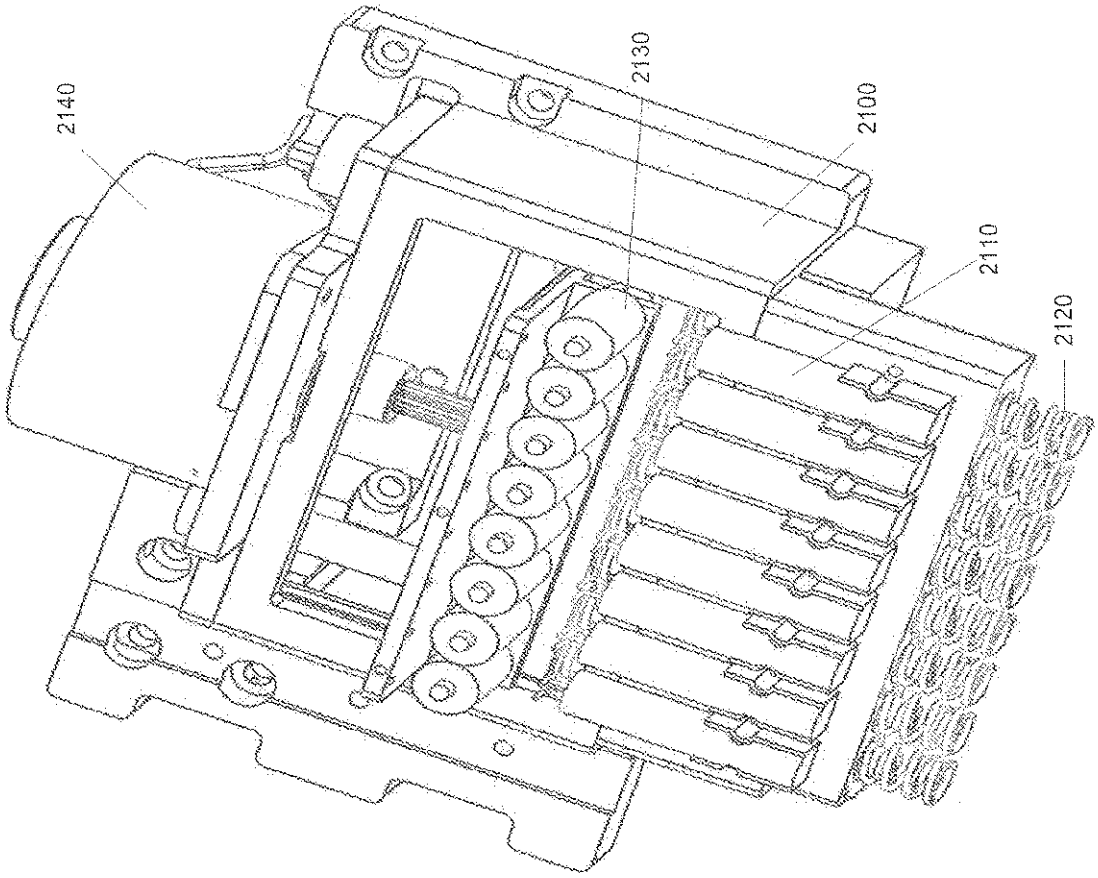
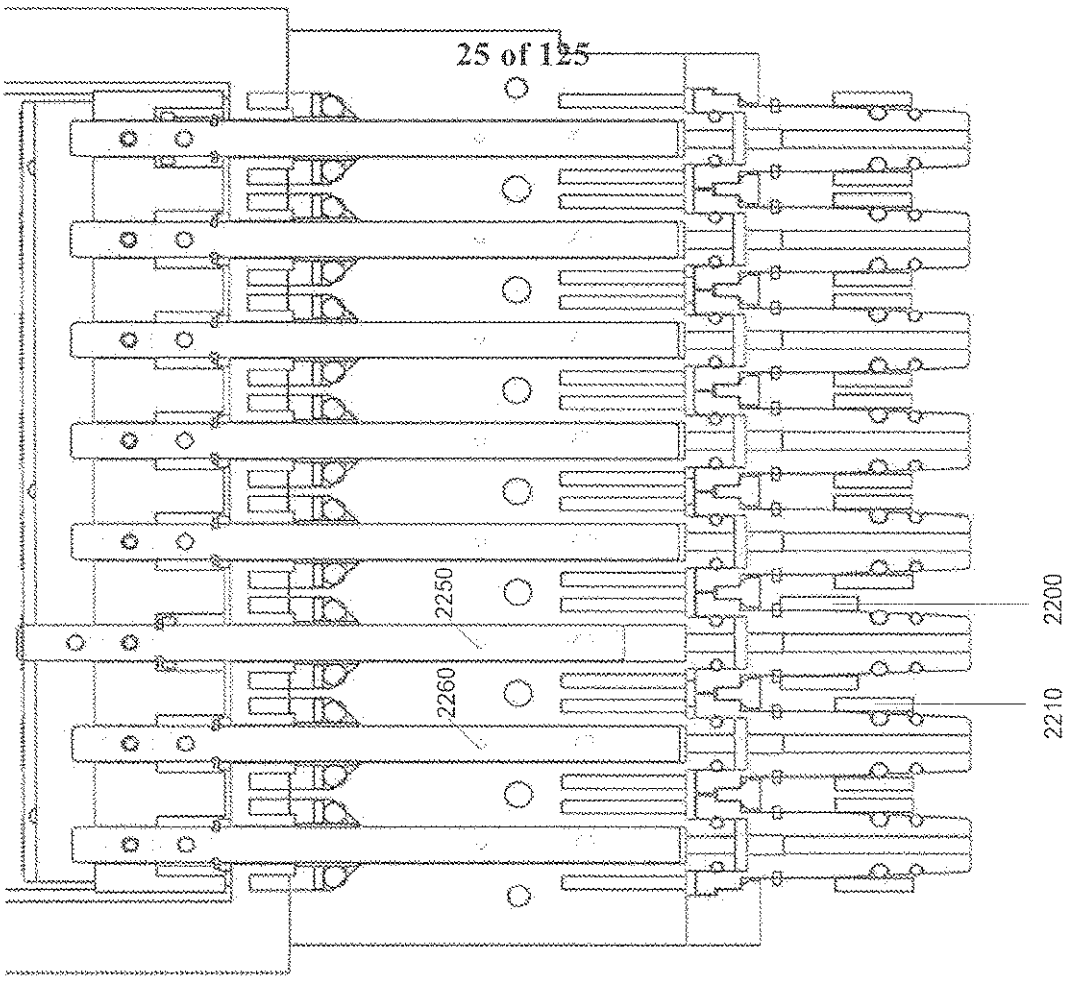


FIG. 21



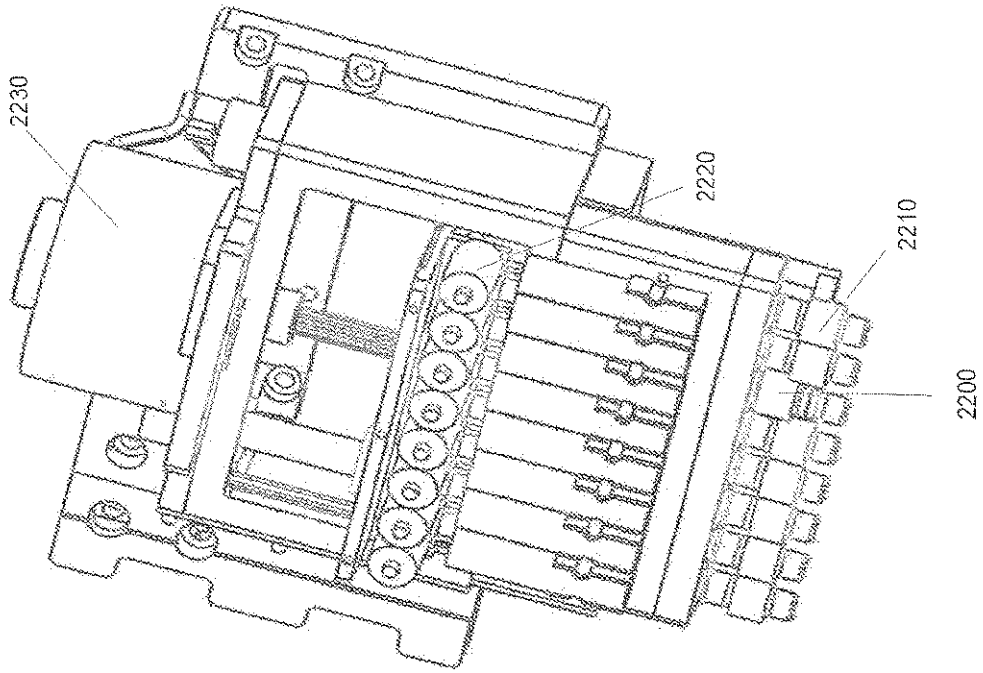


FIG. 22

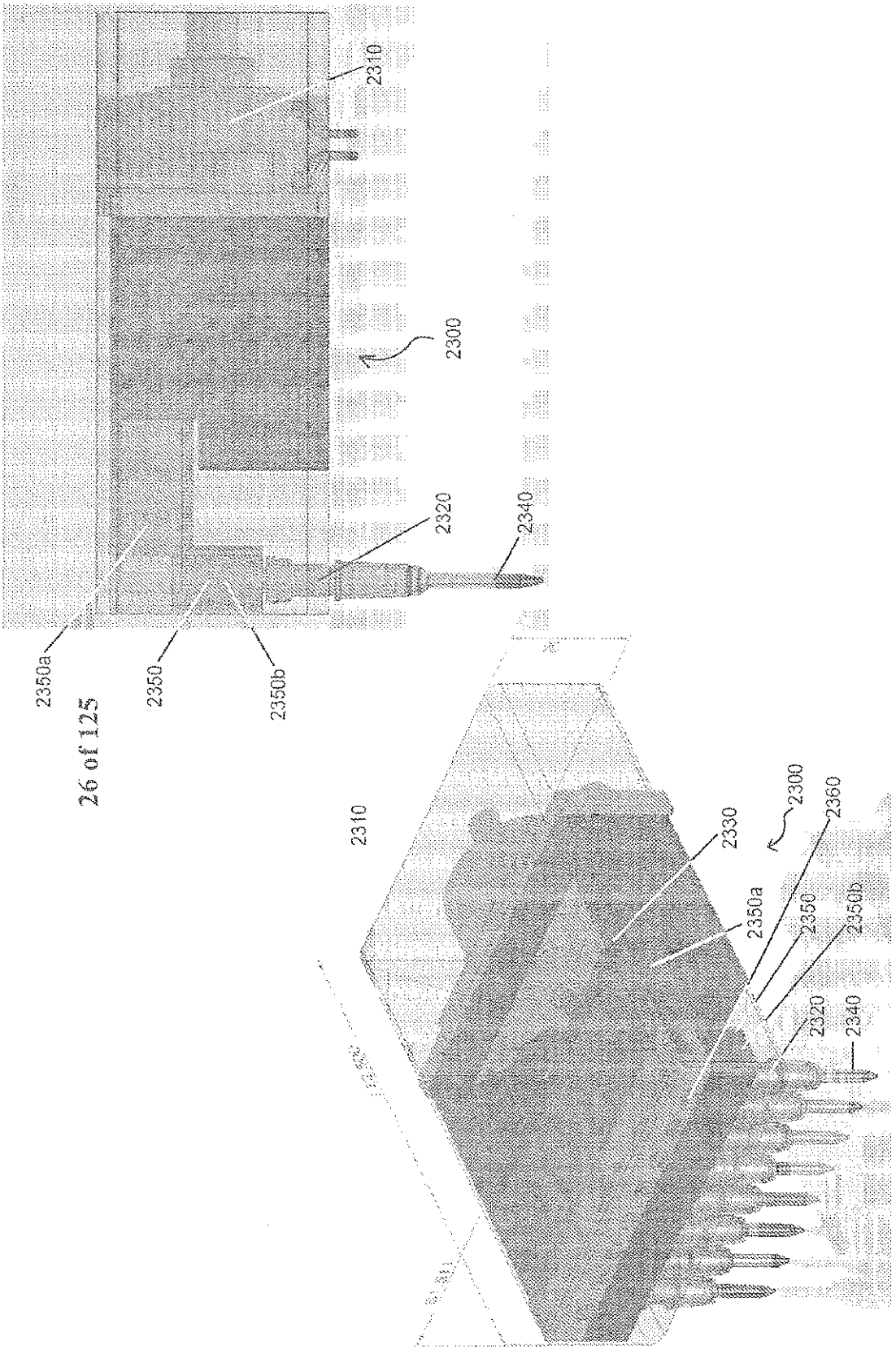
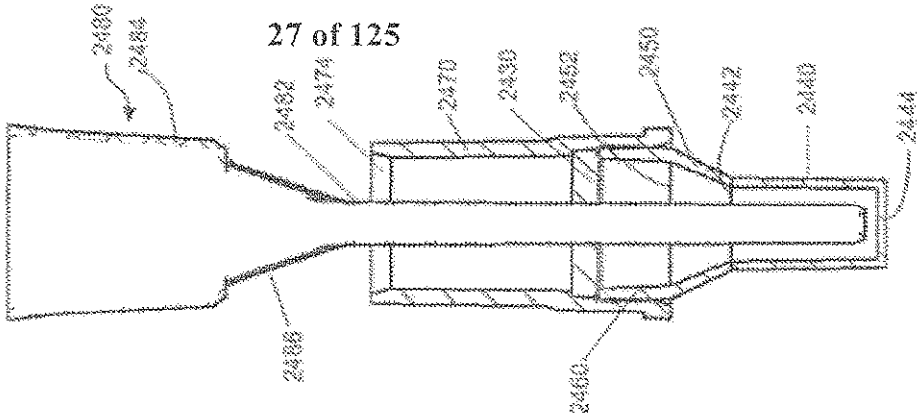

2310
2300
2320
2340
2350a
2350
2350b
2310
2330
2300
2360
2350a
2350
2350b
2320
2340

FIG. 23


2400
2484
2482
2474
2470
2438
2452
2450
2442
2440
2444
2486
2460

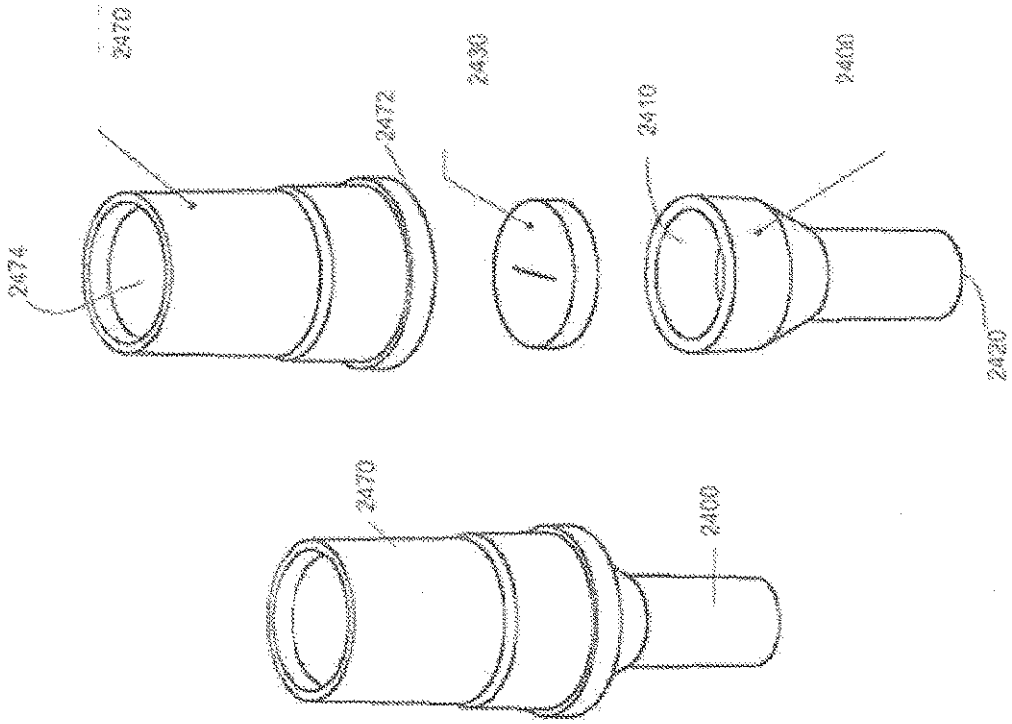

2470
2472
2474
2430
2410
2420
2470
2480

FIG. 24

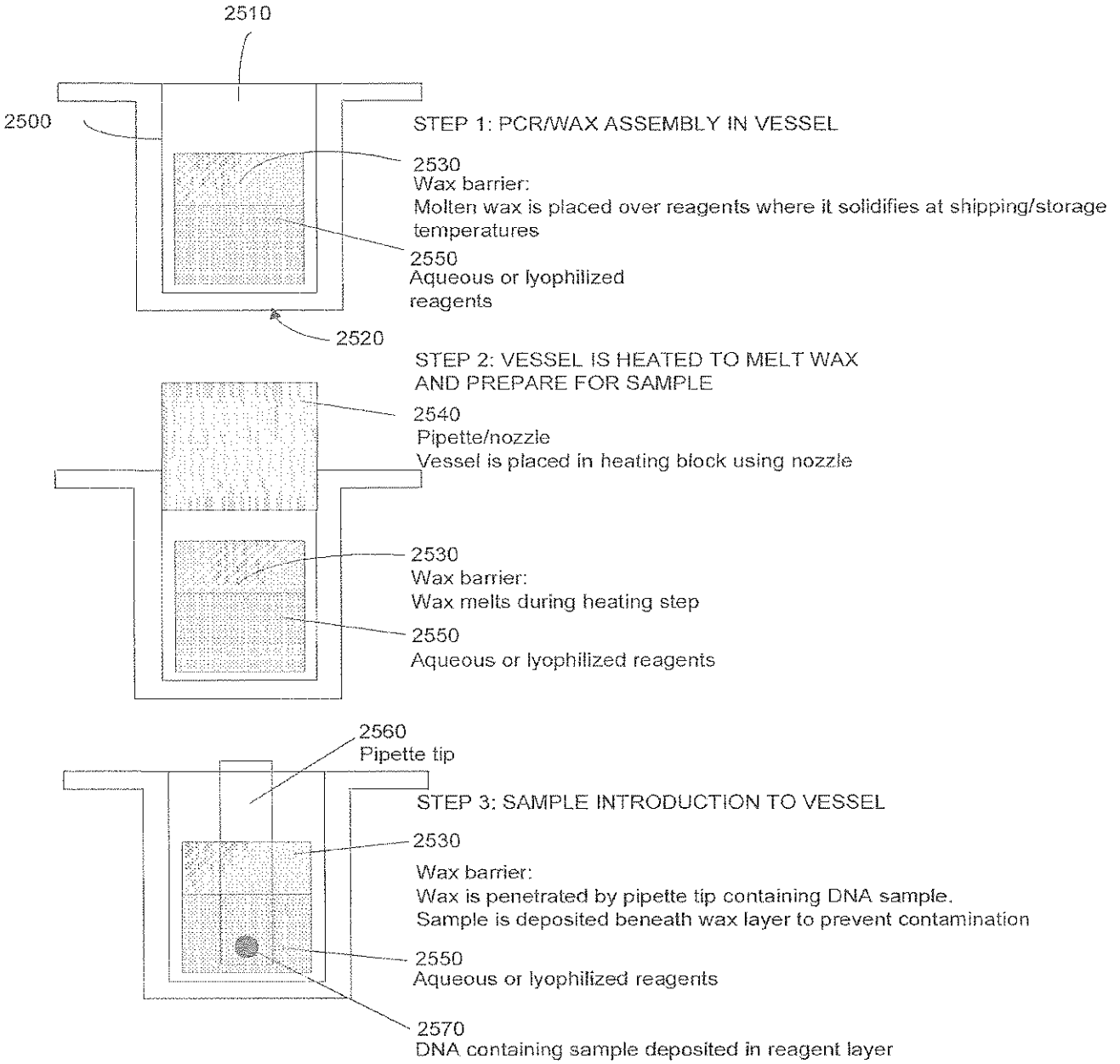
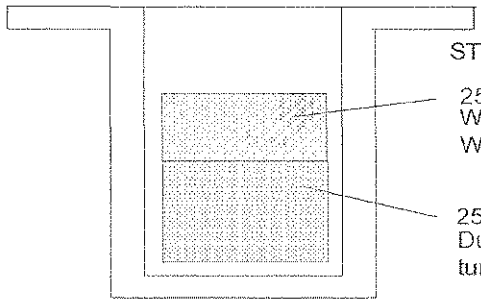

2510
2500
STEP 1: PCR/WAX ASSEMBLY IN VESSEL
2530
Wax barrier:
Molten wax is placed over reagents where it solidifies at shipping/storage temperatures
2550
Aqueous or lyophilized reagents
2520
STEP 2: VESSEL IS HEATED TO MELT WAX AND PREPARE FOR SAMPLE
2540
Pipette/nozzle
Vessel is placed in heating block using nozzle
2530
Wax barrier:
Wax melts during heating step
2550
Aqueous or lyophilized reagents
2560
Pipette tip
STEP 3: SAMPLE INTRODUCTION TO VESSEL
2530
Wax barrier:
Wax is penetrated by pipette tip containing DNA sample.
Sample is deposited beneath wax layer to prevent contamination
2550
Aqueous or lyophilized reagents
2570
DNA containing sample deposited in reagent layer

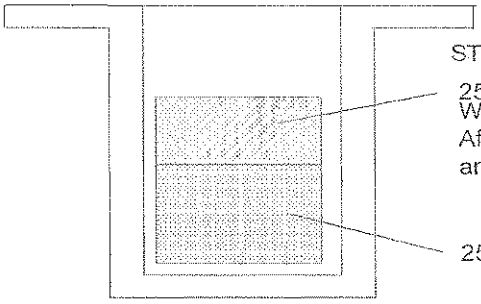
FIG. 25



STEP 4: AMPLIFICATION

2530
Wax barrier:
Wax remains a molten barrier during amplification

2550
During assay, amplification takes place under wax layer,
turbidity readings indicate level of product

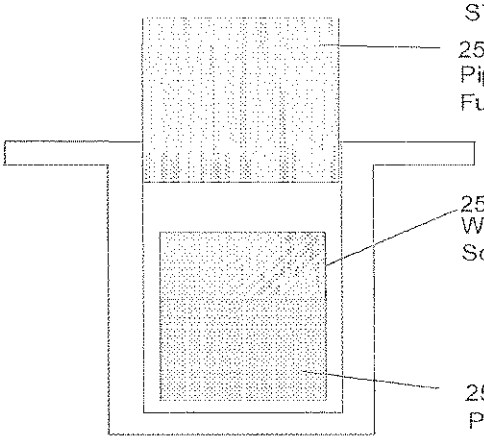


STEP 5: POST AMPLIFICATION WAX SOLIDIFICATION

2530
Wax barrier:
After assay readings are taken, the vessel is cooled and the wax resolidifies and provides a containment barrier for the DNA generated by the PCR

2550

STEP 6: REMOVAL OF LAMP VESSEL



2540
Pipette/nozzle
Fully contained used LAMP vessel is removed

2530
Wax barrier:
Solidified wax barrier

2550
PCR product contained, ready for disposal

FIG. 25 Con't

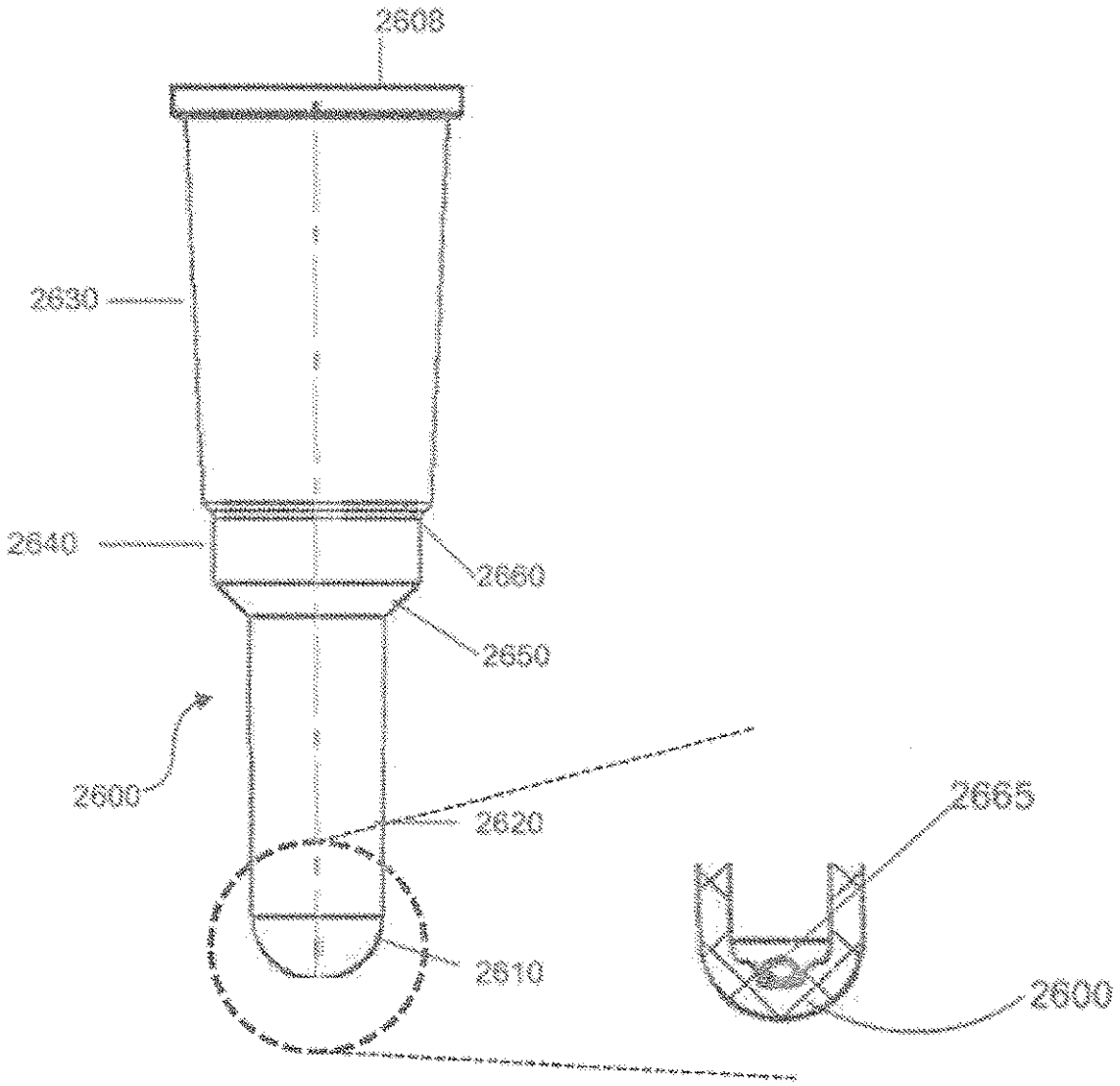


FIG. 26A

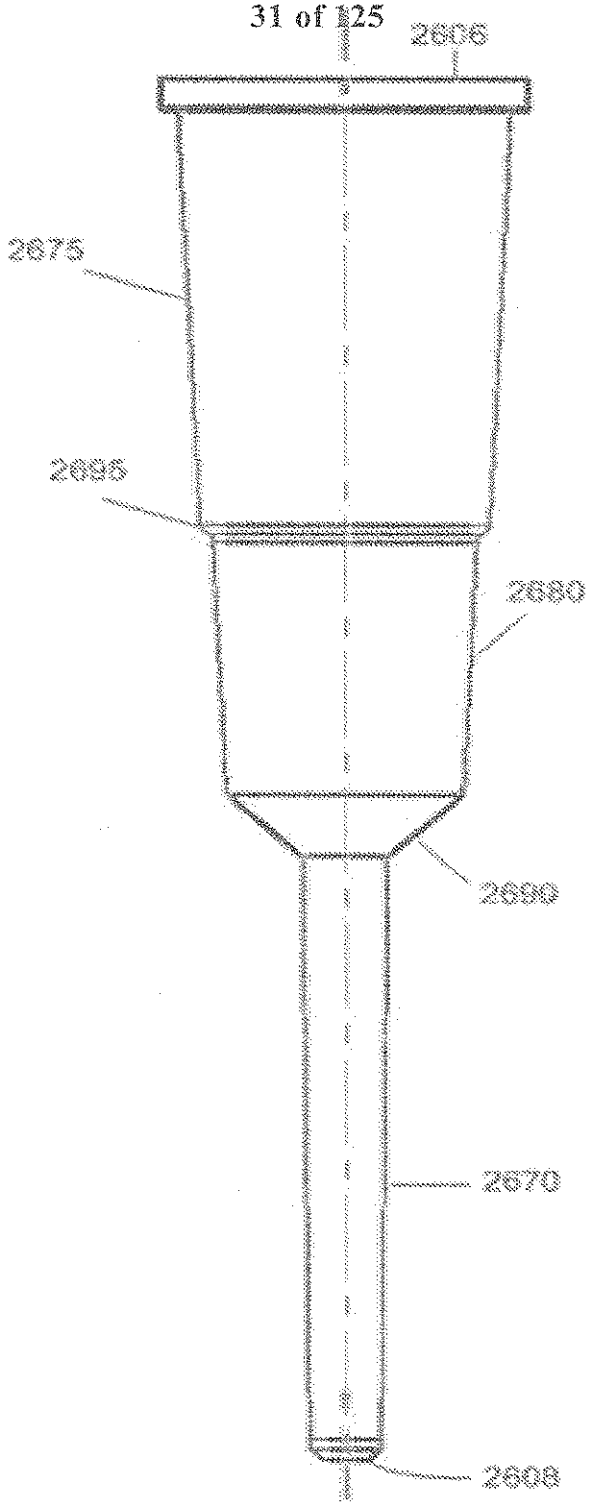


FIG. 26B

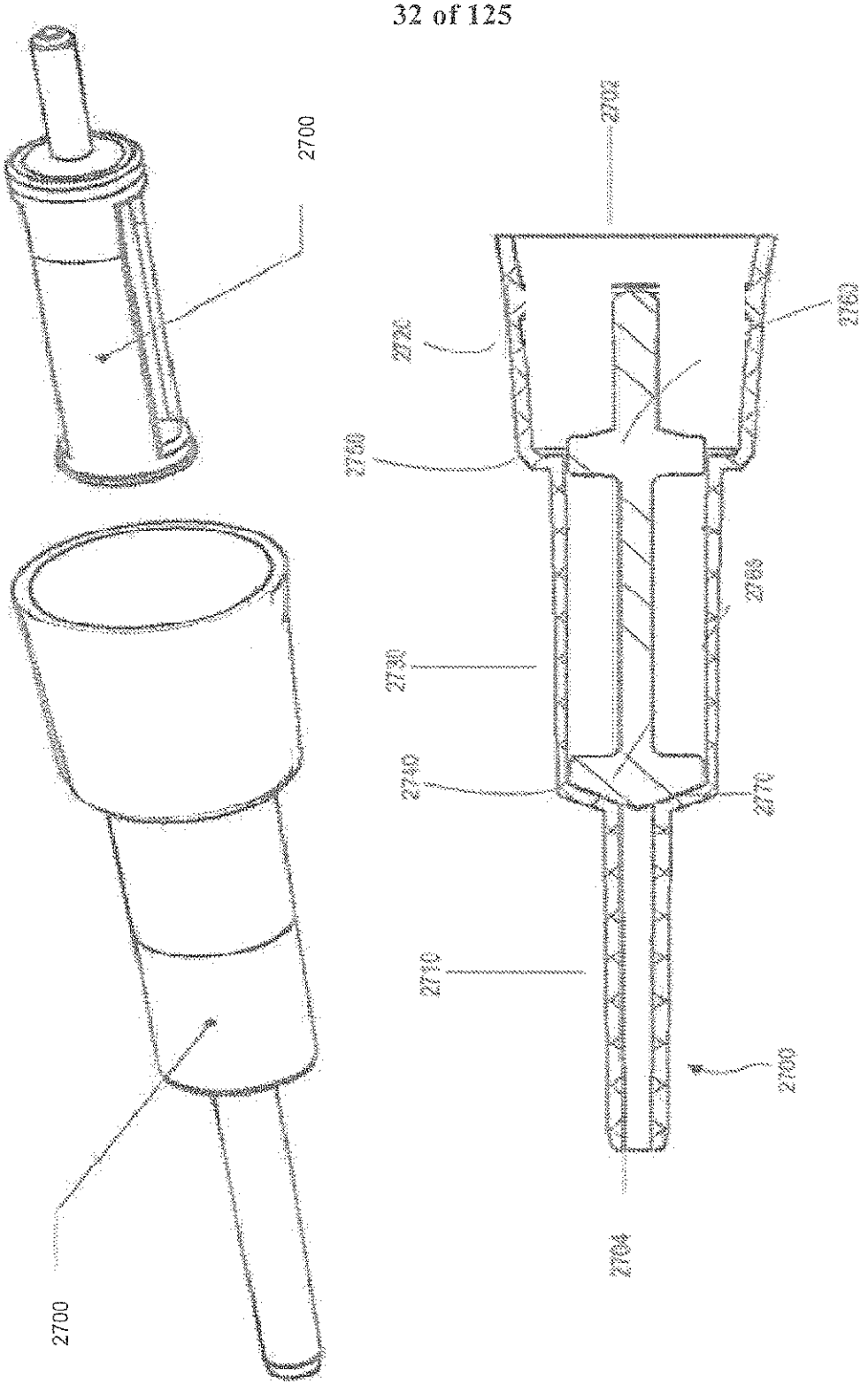

2700
2700
2702
2760
2720
2760
2780
2730
2740
2770
2710
2790
2704

FIG. 27

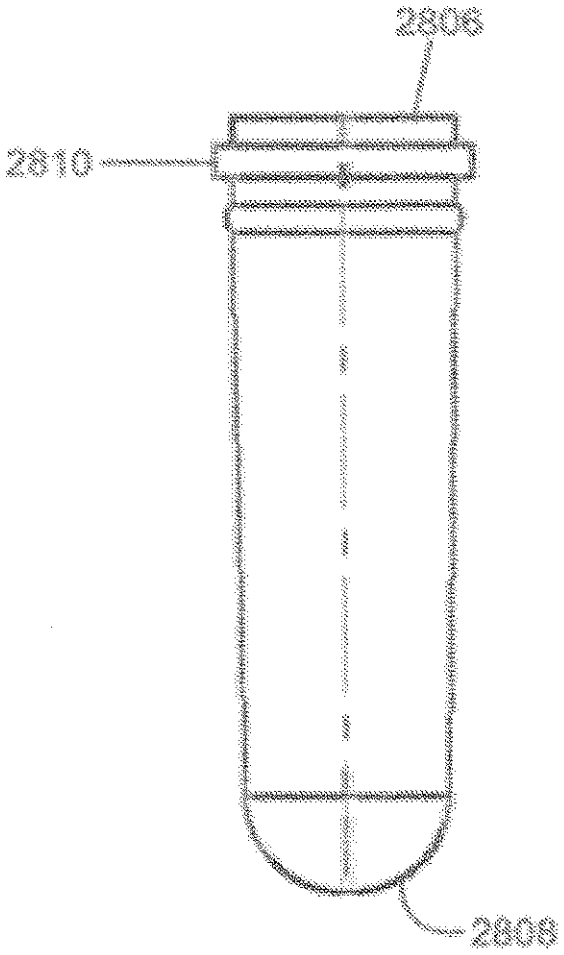


FIG. 28

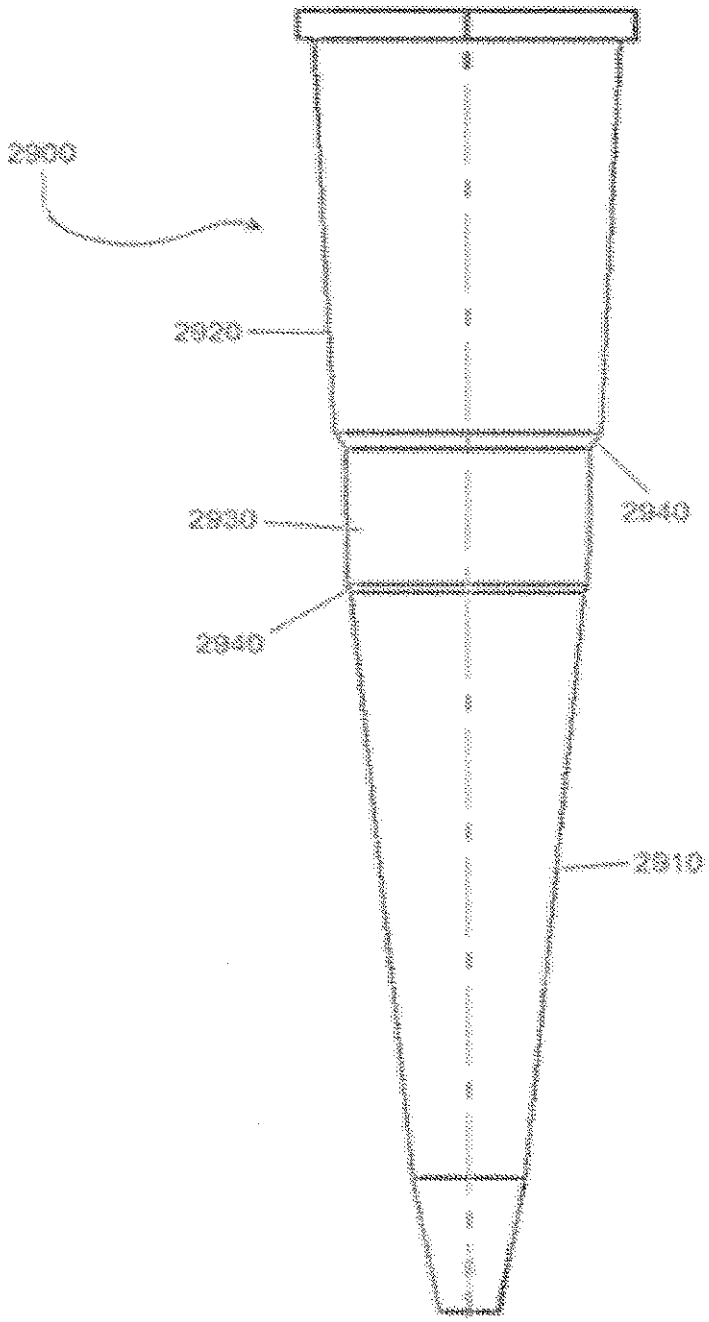


FIG. 29

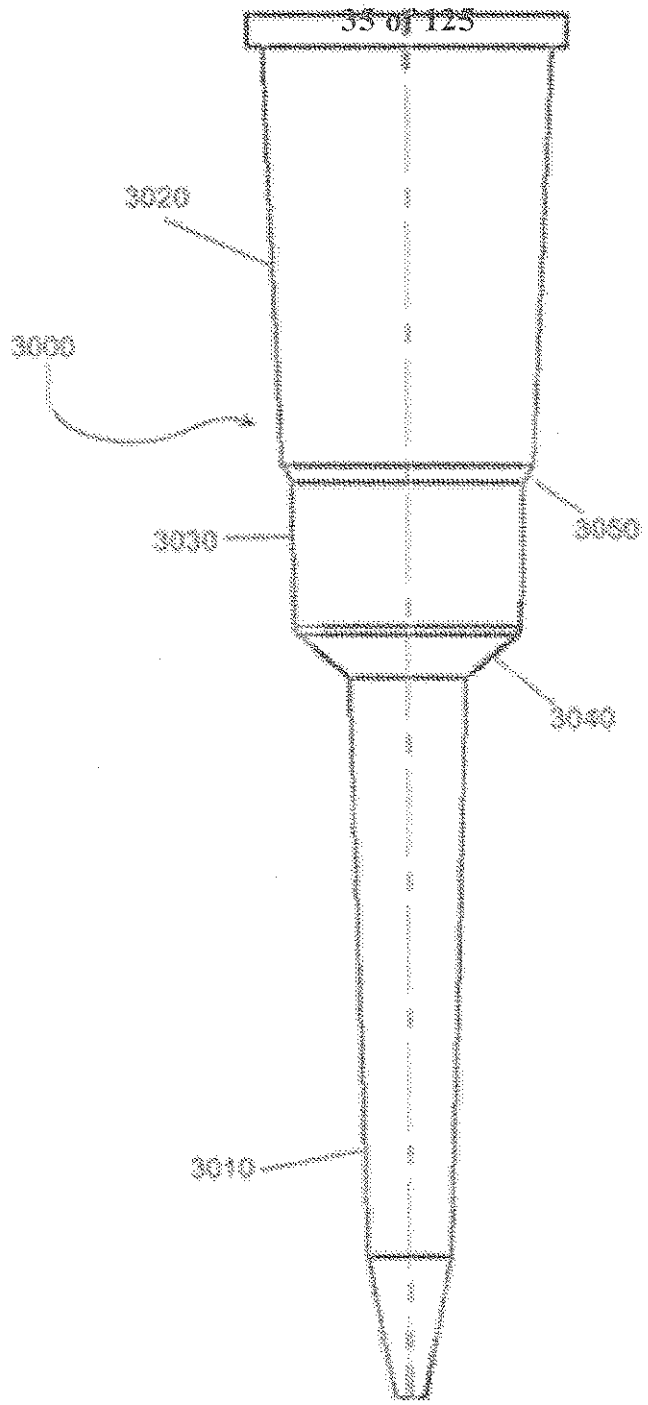


FIG. 30

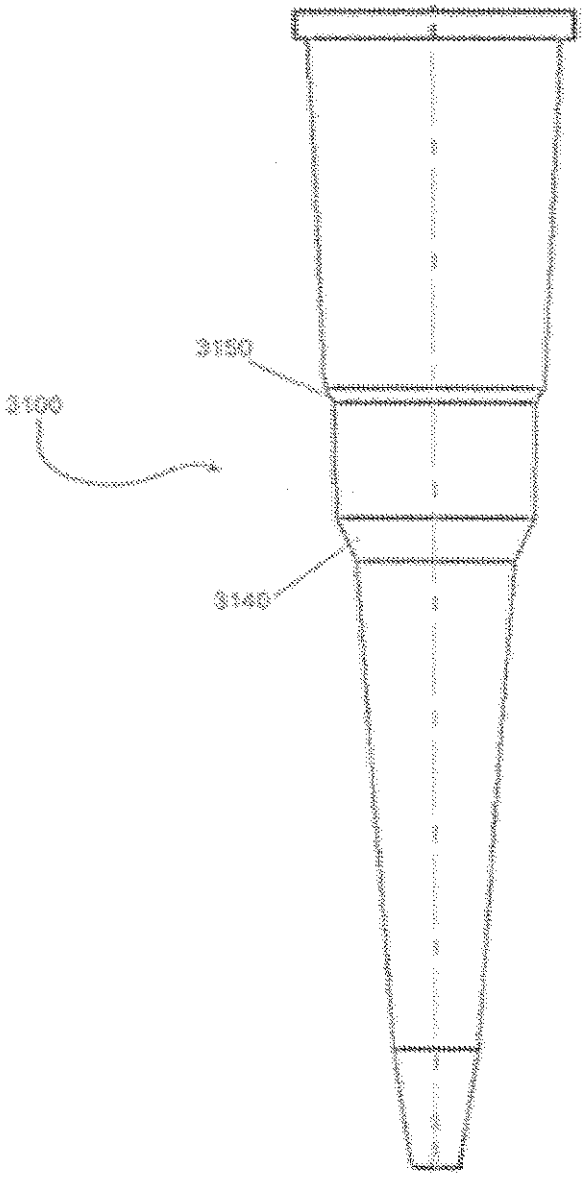


FIG. 31

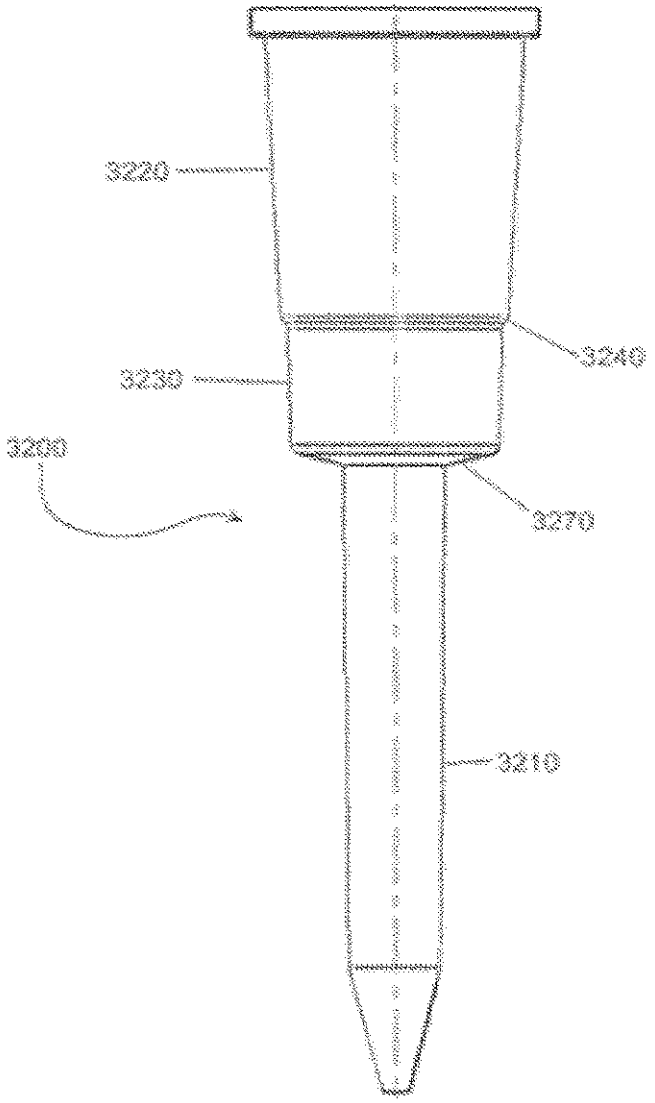


FIG. 32

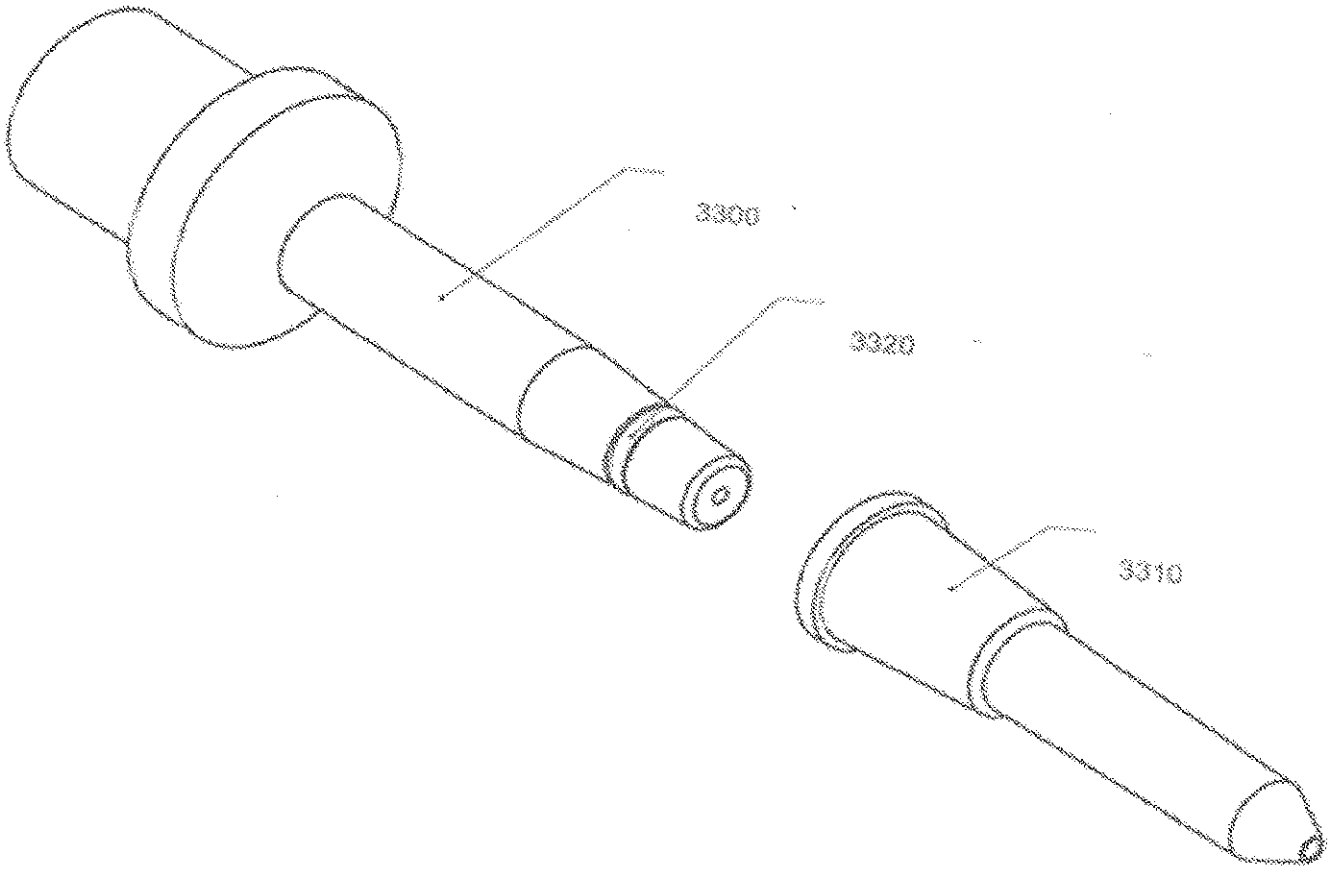


FIG. 33

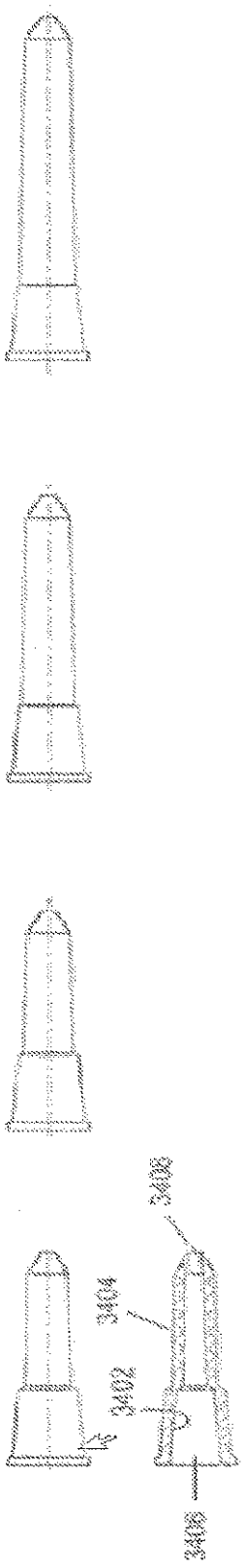


FIG. 34

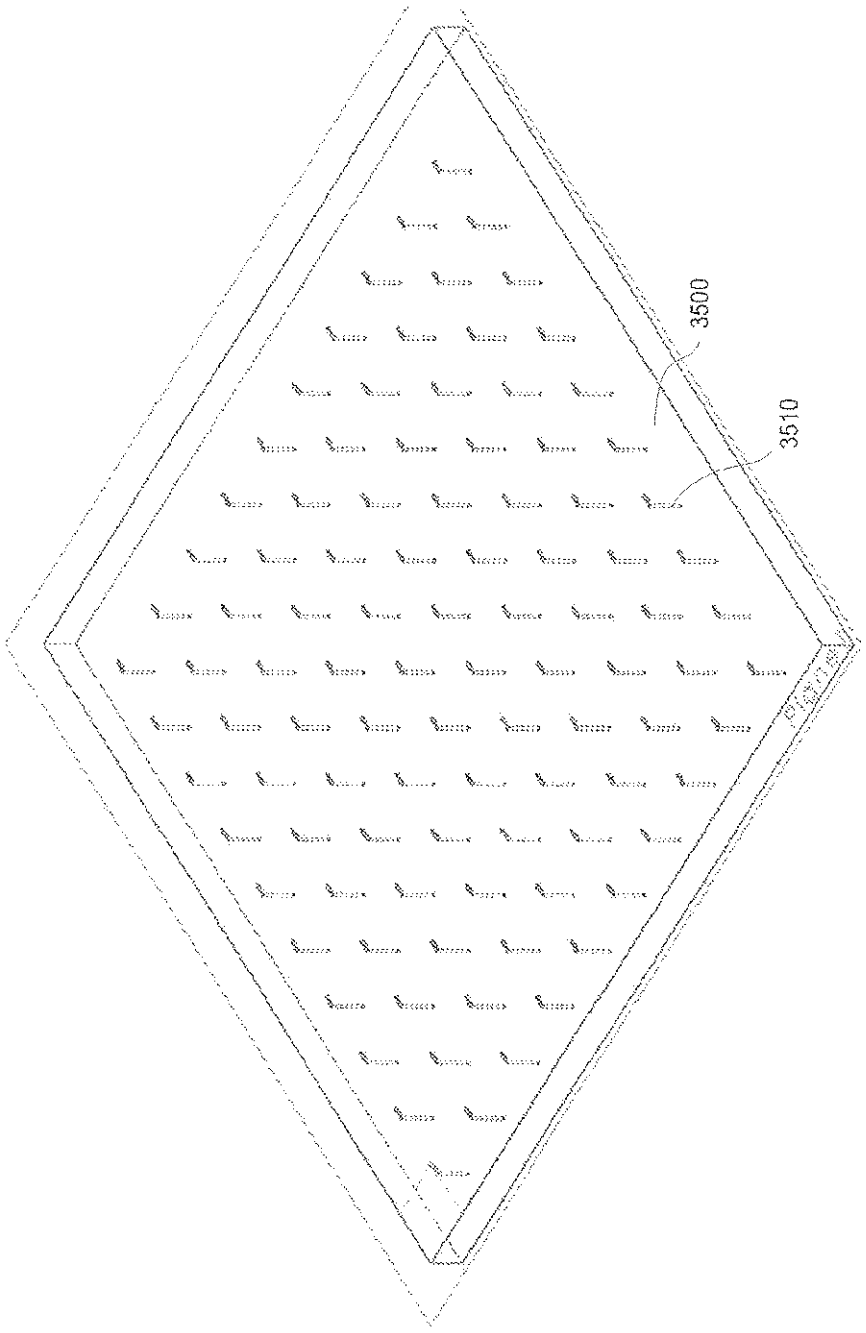


FIG. 35

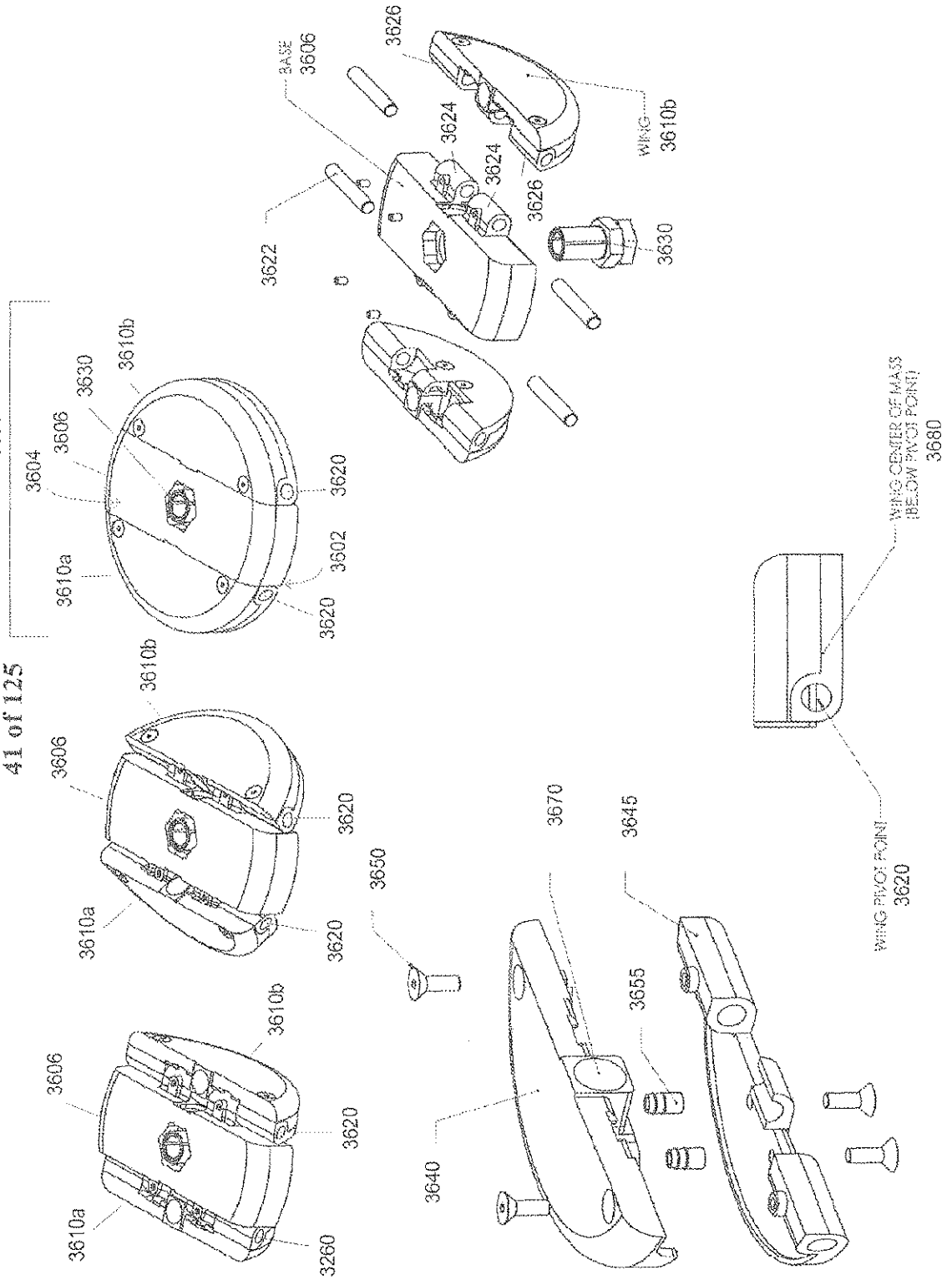

3600
3604
3606
3630
3610b
3610a
3620
3602
3620
3620
3606
3610b
3610a
3620
3620
3650
3606
3610b
3610a
3620
3260
3640
3670
3645
3655
3620
WING PIVOT POINT
WING CENTER OF MASS (BELOW PIVOT POINT)
3680
BASE
3606
3626
3624
3624
3626
WING
3610b
3622
3630

FIG. 36

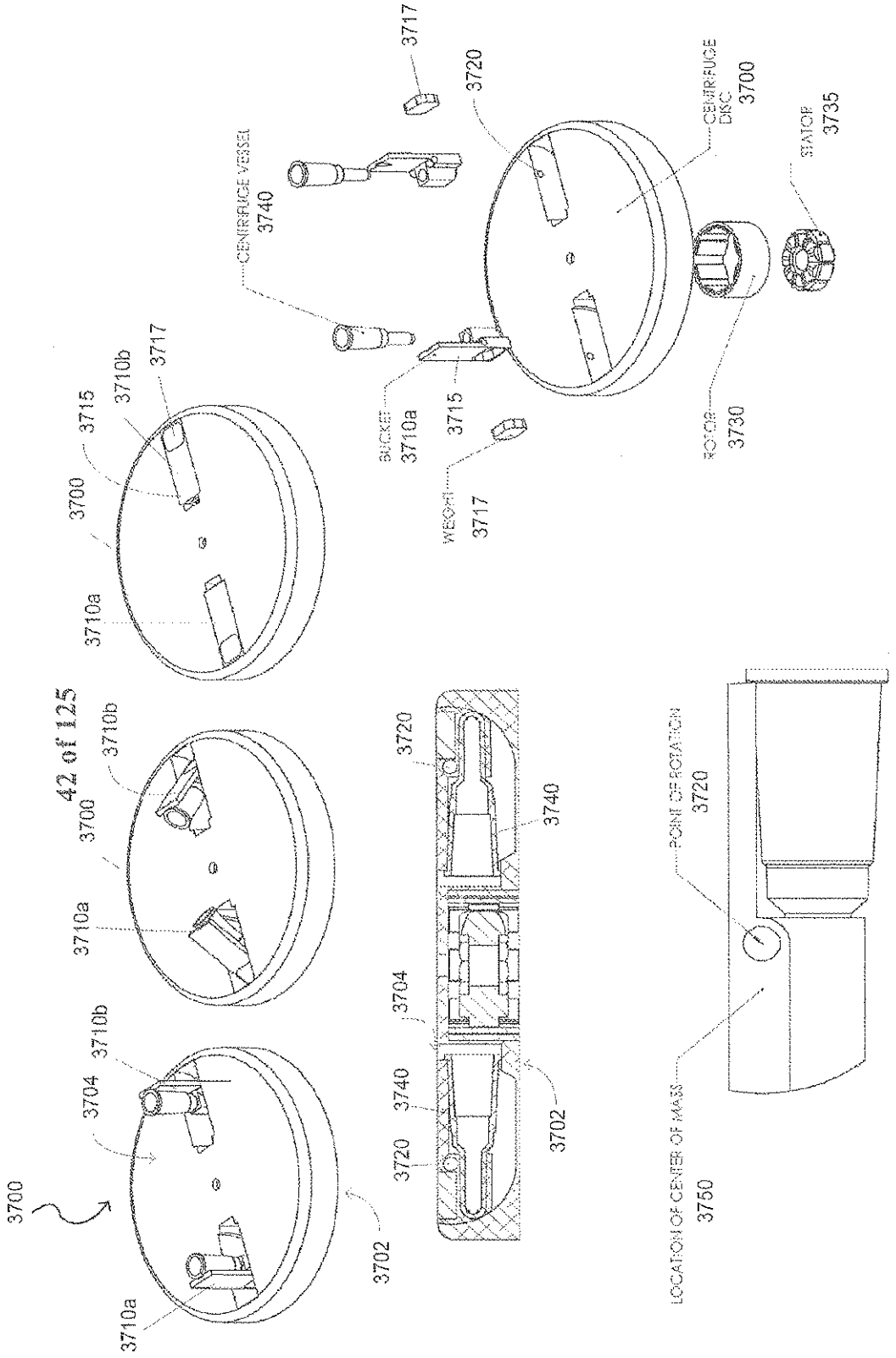

3700
3704
3710b
3710a
3702
3720
3740
3704
3740
3720
3702
3717
3720
CENTRIFUGE VESSEL
3740
CENTRIFUGE DISC
3700
STATOR
3735
3715
3710b
3717
3700
3715
BUCKET
3710a
WEIGHT
3717
ROTOR
3730
3710b
3700
3710a
LOCATION OF CENTER OF MASS
3750
POINT OF ROTATION
3720

FIG. 37

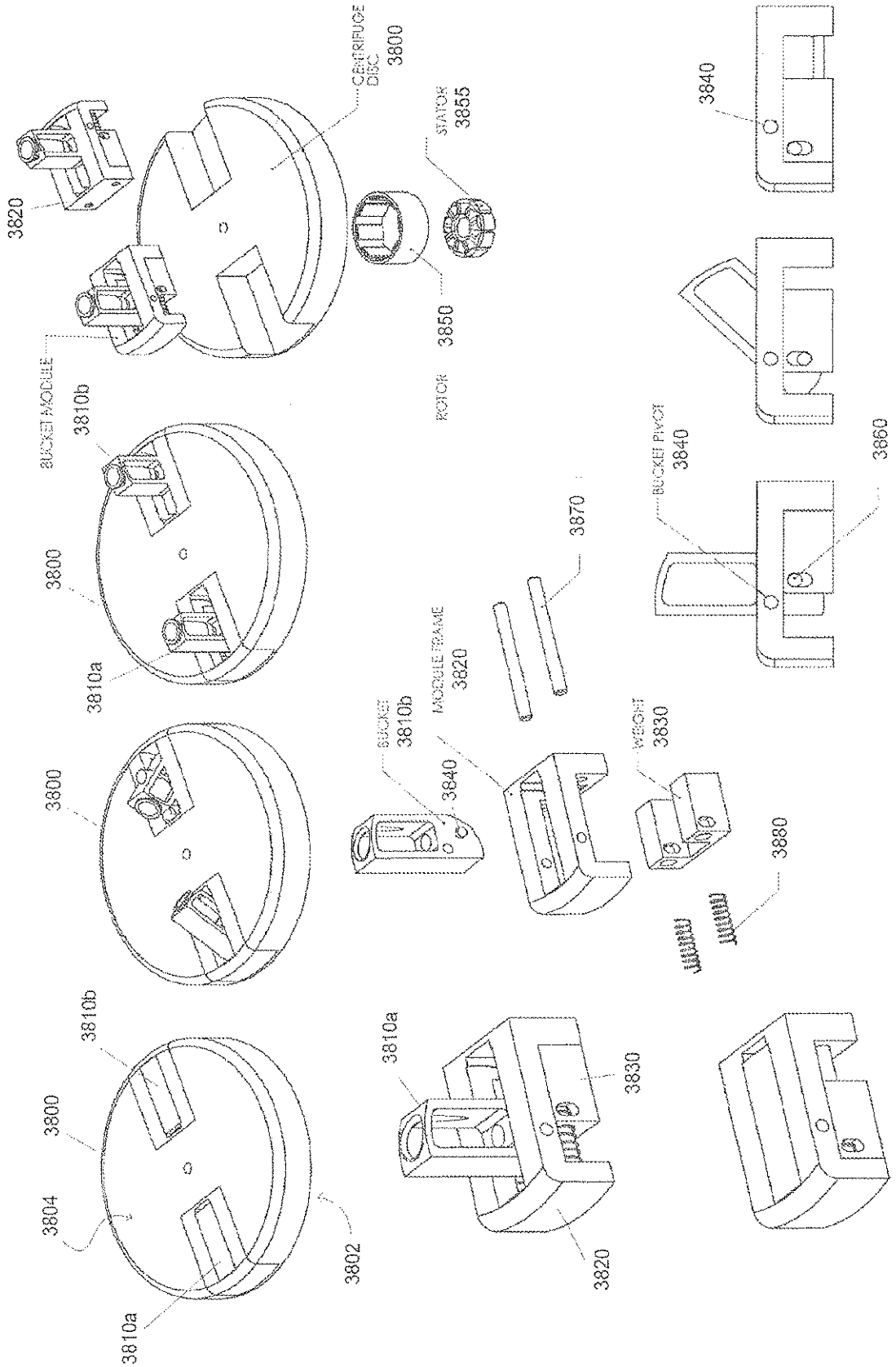

3820
CENTRIFUGE DISC
3800
STATOR
3855
3850
ROTOR
BUCKET MODULE
3810b
3800
3810a
3800
3800
3810b
3804
3802
3810a
3810a
3830
3820
BUCKET
3810b
3840
MODULE FRAME
3820
3870
WEIGHT
3830
3880
BUCKET PIVOT
3840
3860
3840

FIG. 38

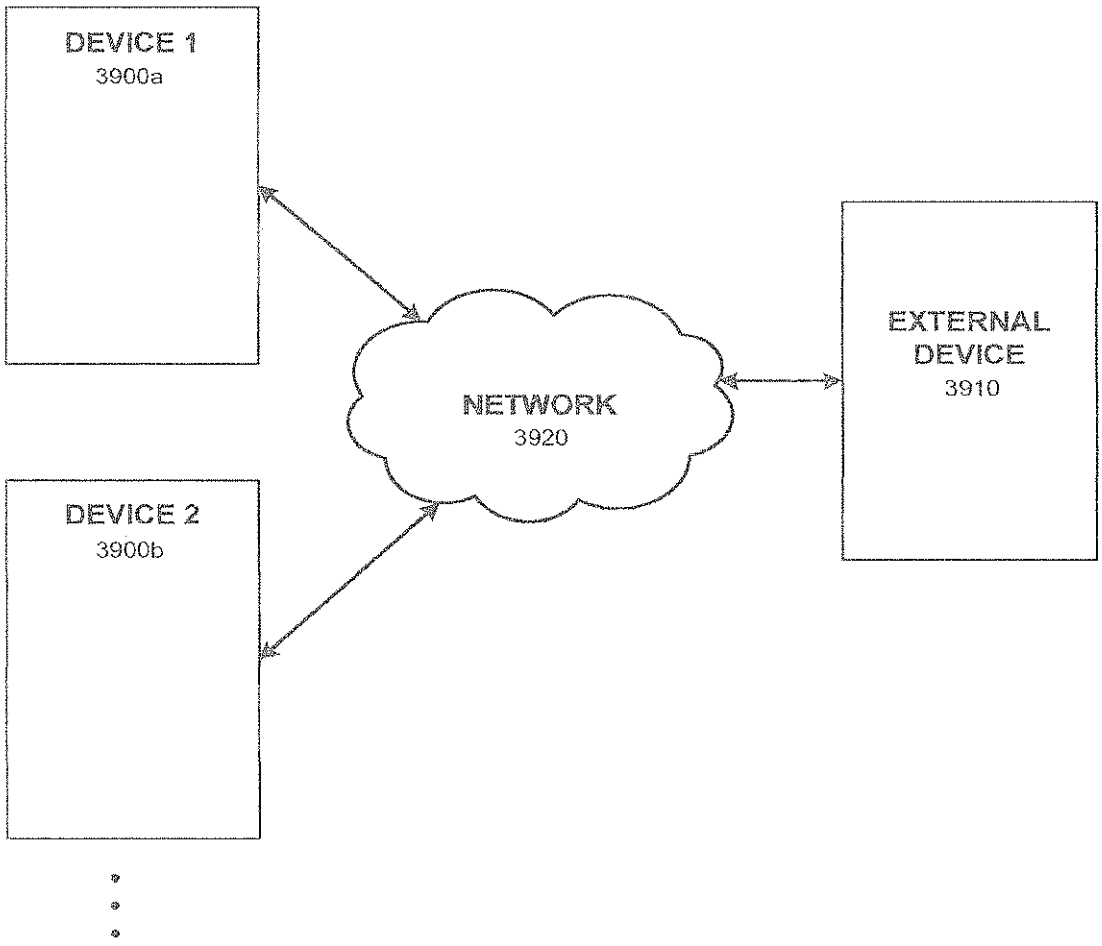

DEVICE 1
3900a
DEVICE 2
3900b
NETWORK
3920
EXTERNAL
DEVICE
3910

FIG. 39

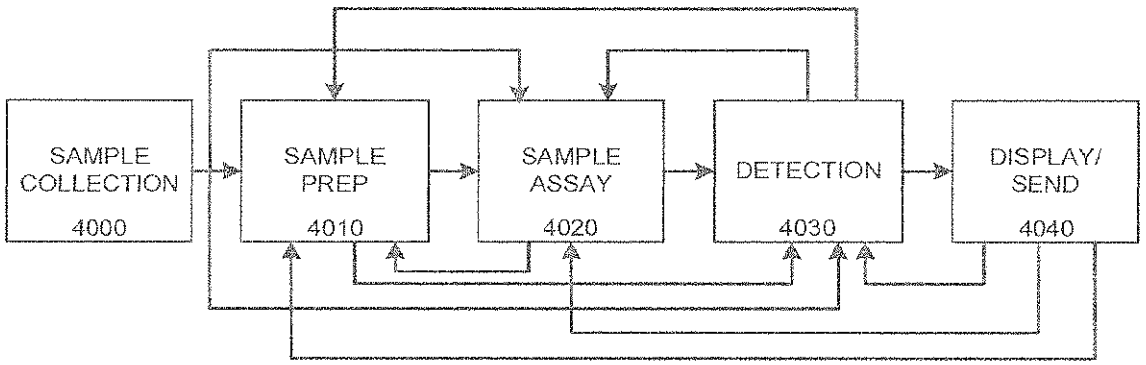

SAMPLE COLLECTION
4000
SAMPLE PREP
4010
SAMPLE ASSAY
4020
DETECTION
4030
DISPLAY/ SEND
4040
2000

FIG. 40

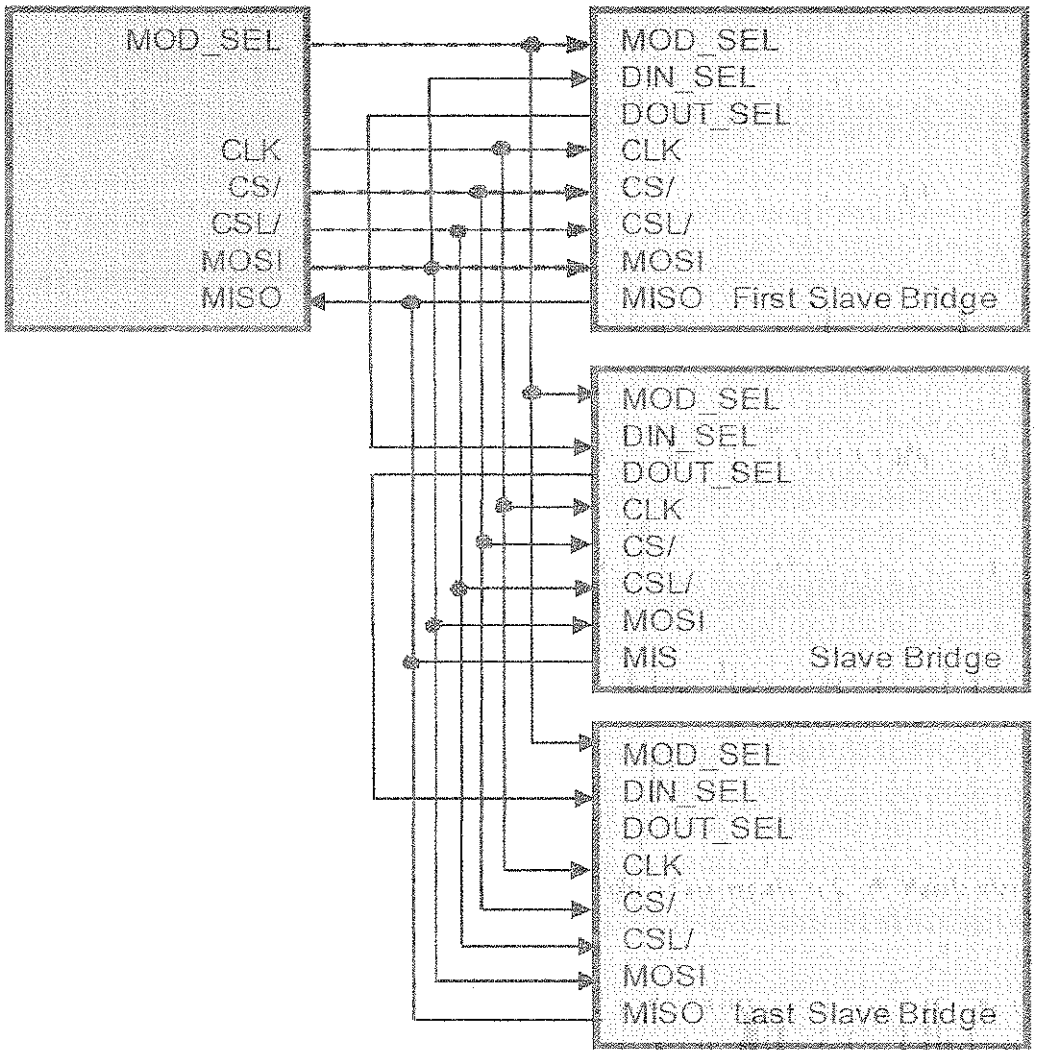

MOD_SEL
CLK
CS/
CSL/
MOSI
MISO
MOD_SEL
DIN_SEL
DOUT_SEL
CLK
CS/
CSL/
MOSI
MISO
First Slave Bridge
MOD_SEL
DIN_SEL
DOUT_SEL
CLK
CS/
CSL/
MOSI
MIS
Slave Bridge
MOD_SEL
DIN_SEL
DOUT_SEL
CLK
CS/
CSL/
MOSI
MISO
Last Slave Bridge

FIG. 41A

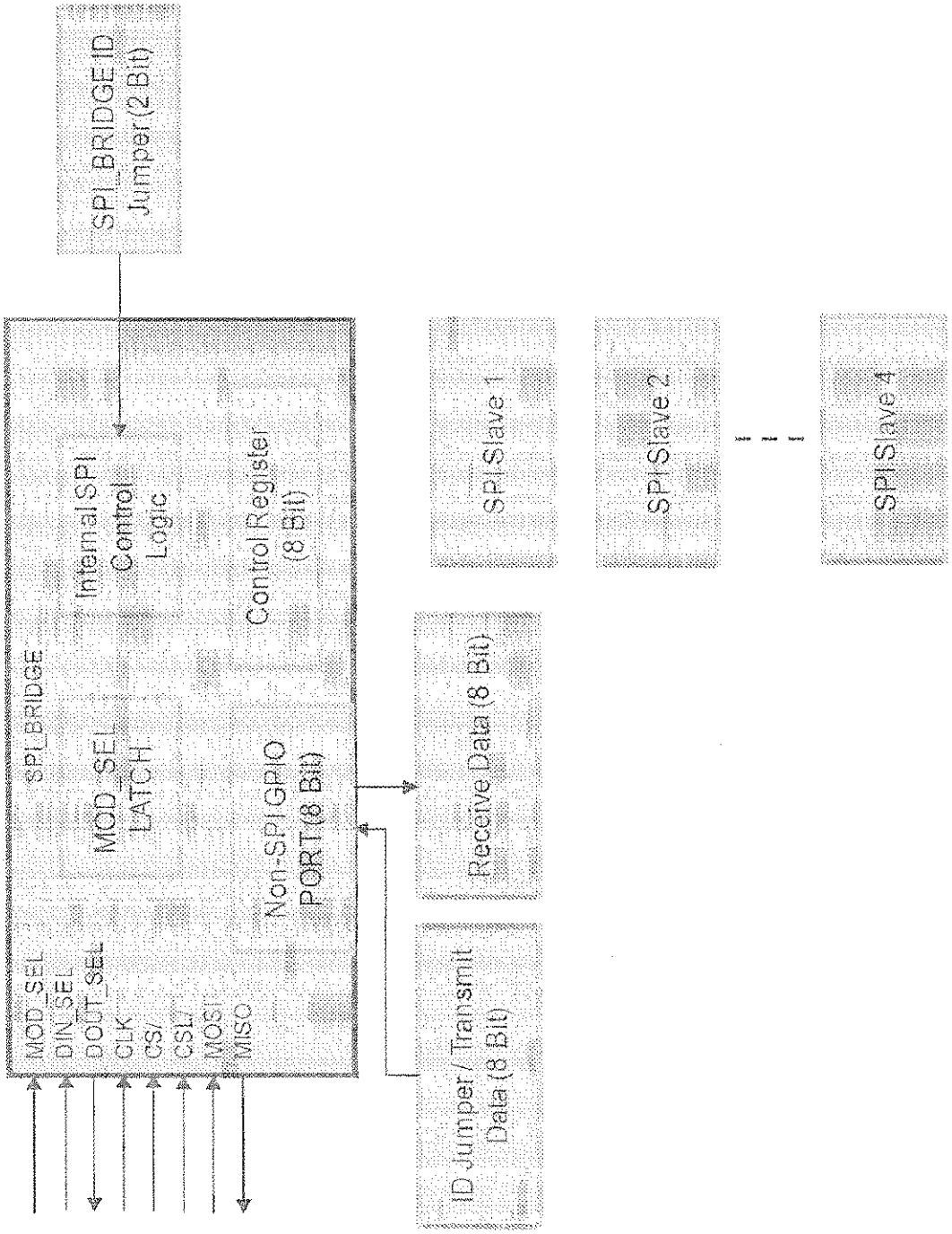

SPI_BRIDGE ID
Jumper (2 Bit)
SPI_BRIDGE
Internal SPI
Control
Logic
MOD_SEL
LATCH
Control Register
(8 Bit)
Non-SPI GPIO
PORT (8 Bit)
MOD_SEL
DIN_SEL
DOUT_SEL
CLK
CS/
CS1/
MOSI
MISO
SPI Slave 1
SPI Slave 2
SPI Slave 4
Receive Data (8 Bit)
ID Jumper / Transmit
Data (8 Bit)

FIG. 41B

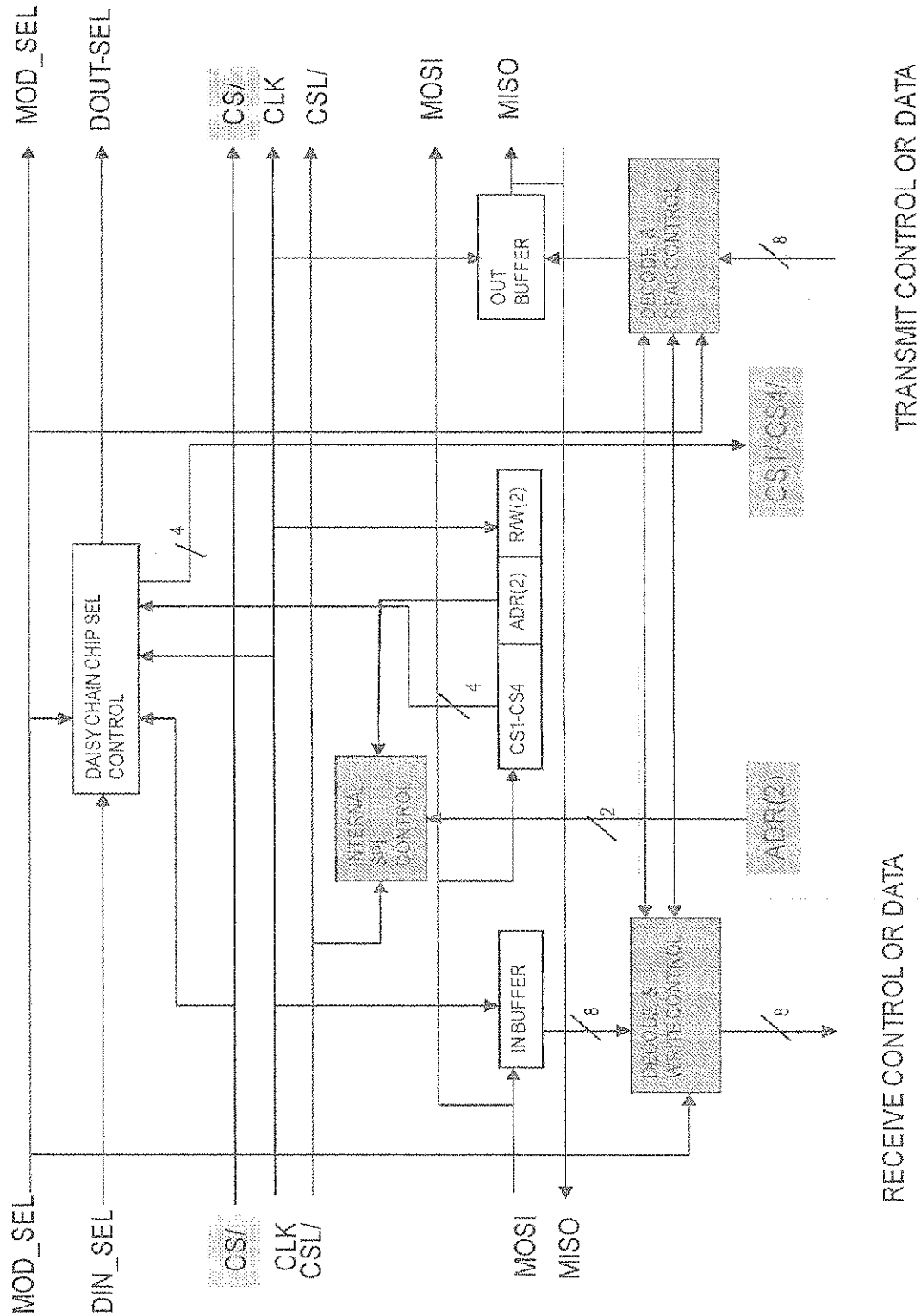

MOD_SEL
DOUT-SEL
CS/
CLK
CSL/
MOSI
MISO
DAISY CHAIN CHIP SEL CONTROL
4
OUT BUFFER
ENCODE & CRC CONTROL
8
R/W(2)
ADR(2)
CS1-CS4
4
CS1-CS4/
INTERNAL SPI CONTROL
2
ADR(2)/
INBUFFER
8
DECODE & CRC CONTROL
8
MOD_SEL
DIN_SEL
CS/
CLK
CSL/
MOSI
MISO
RECEIVE CONTROL OR DATA
TRANSMIT CONTROL OR DATA

FIG. 41C

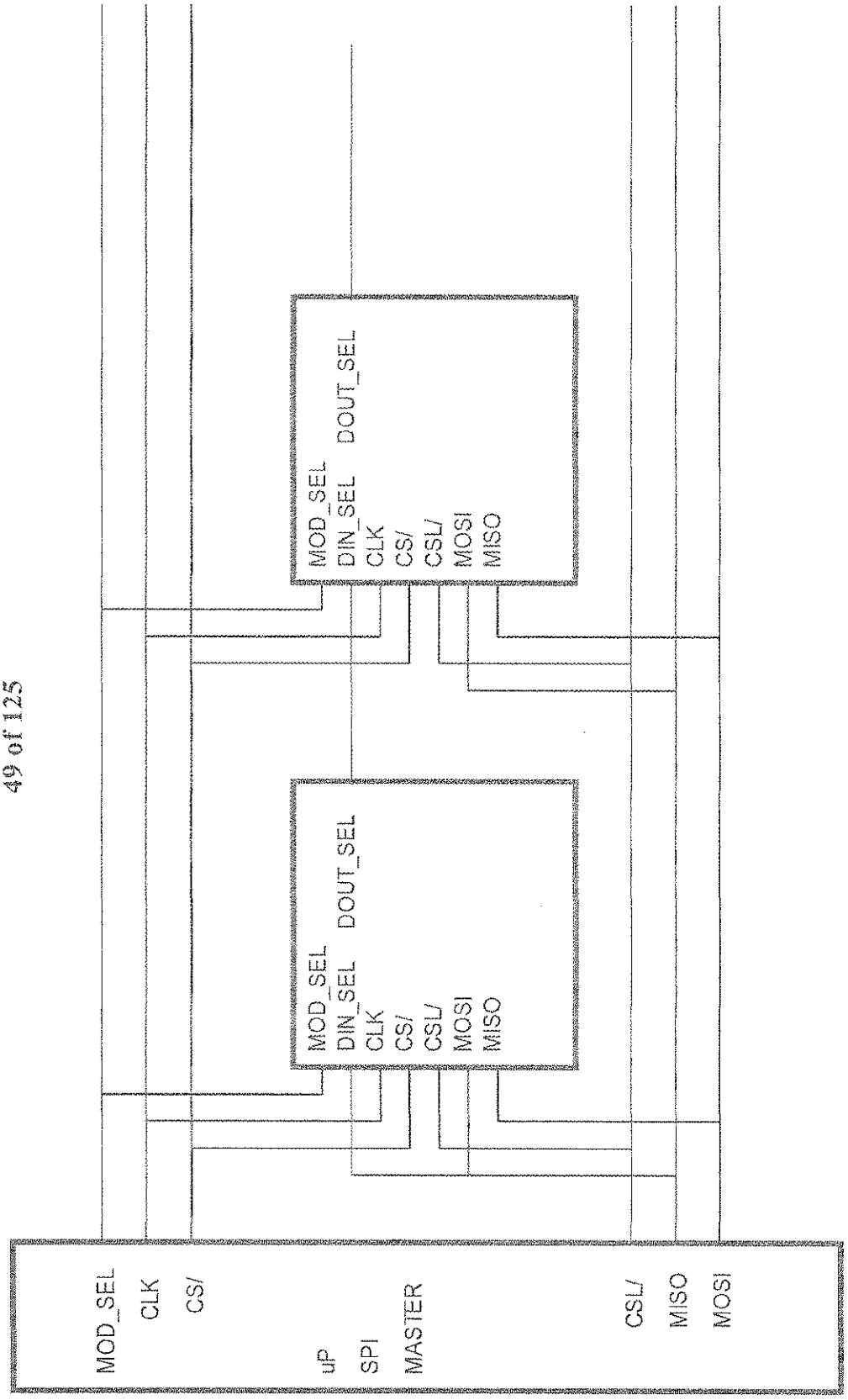

MOD_SEL
CLK
CS/
uP
SPI
MASTER
CSL/
MISO
MOSI
MOD_SEL
DIN_SEL
DOUT_SEL
CLK
CS/
CSL/
MOSI
MISO
MOD_SEL
DIN_SEL
DOUT_SEL
CLK
CS/
CSL/
MOSI
MISO

FIG. 41D

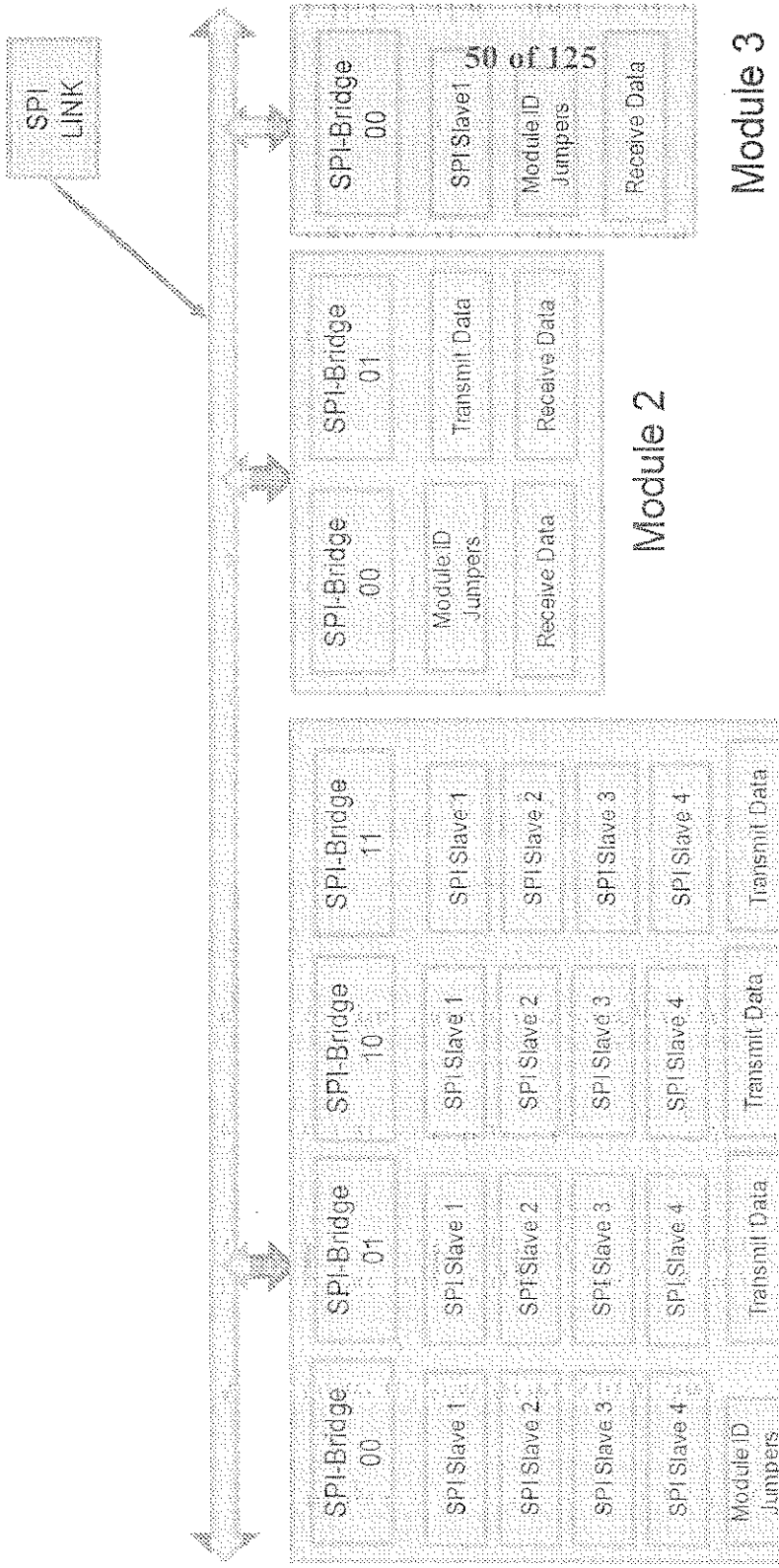

SPI LINK
SPI-Bridge 00
SPI-Bridge 01
SPI-Bridge 10
SPI-Bridge 11
SPI Slave 1
SPI Slave 2
SPI Slave 3
SPI Slave 4
Module ID Jumpers
Transmit Data
Receive Data
Module 1
Module 2
Module 3

FIG. 41E

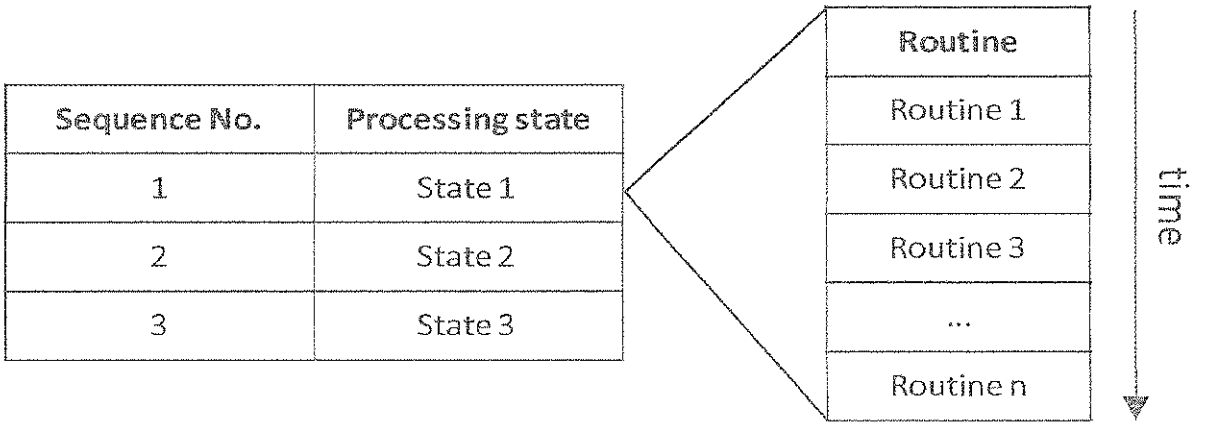

Sequence No.
Processing state
1
State 1
2
State 2
3
State 3
Routine
Routine 1
Routine 2
Routine 3
...
Routine n
time

FIG. 42

Sequence No.	Processing state
1	Centrifuge sample
2	Perform cytometry on sample
3	Conduct agglutination assay on sample

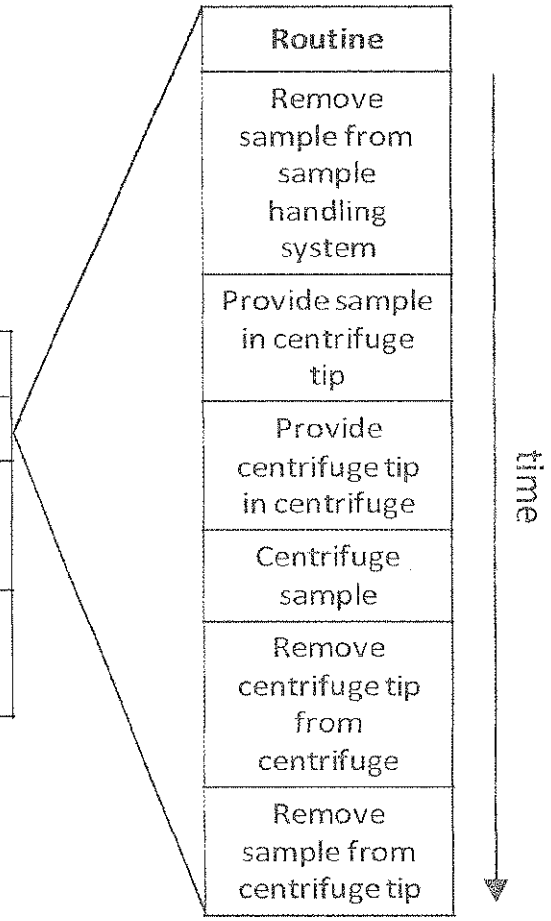


FIG. 43

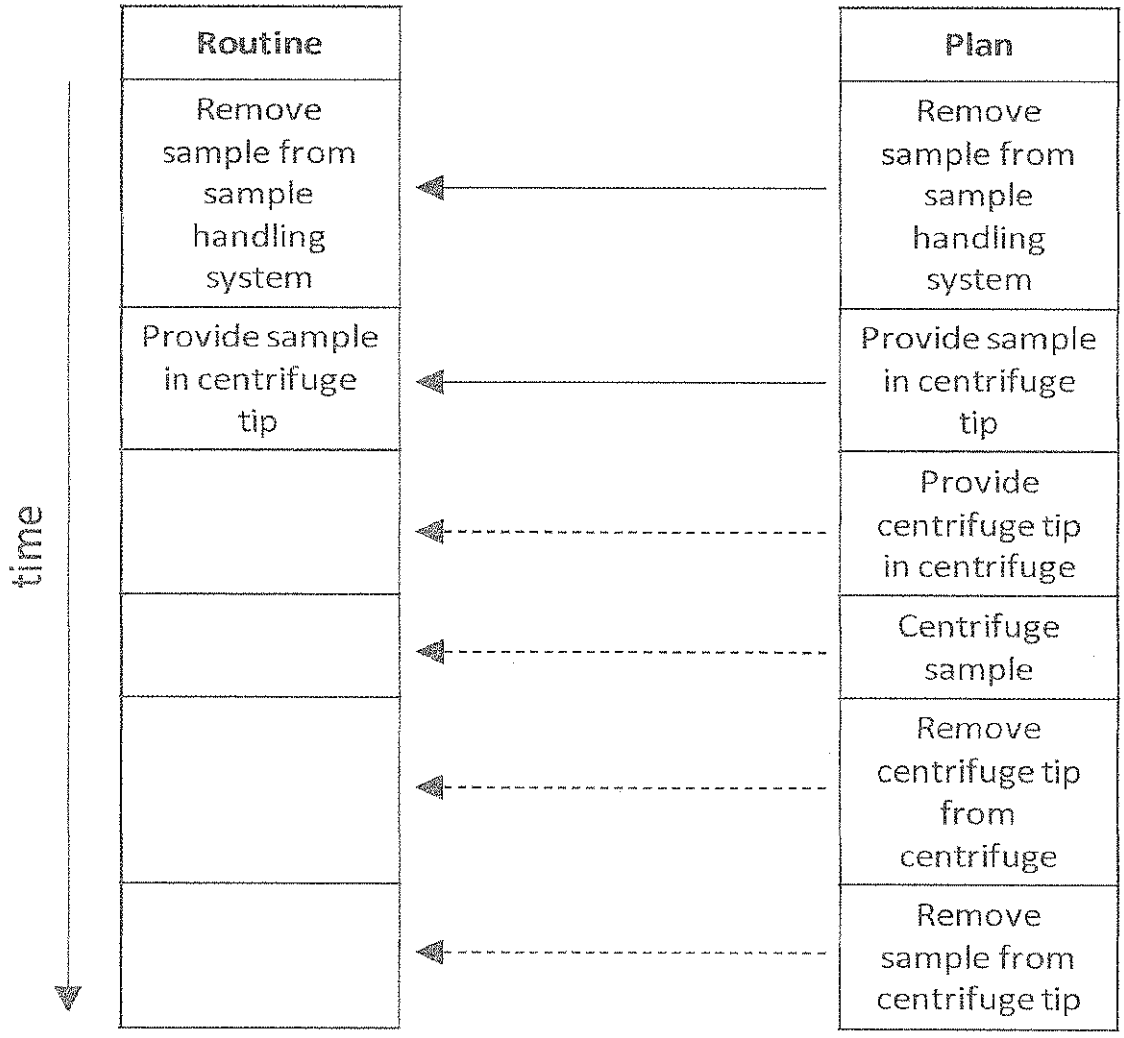

Routine
Plan
Remove sample from sample handling system
Remove sample from sample handling system
Provide sample in centrifuge tip
Provide sample in centrifuge tip
Provide centrifuge tip in centrifuge
Centrifuge sample
Remove centrifuge tip from centrifuge
Remove sample from centrifuge tip
time

FIG. 44

Sequence No.	Processing state
1	Centrifuge sample
2	Perform cytometry on sample
3	Conduct agglutination assay on sample

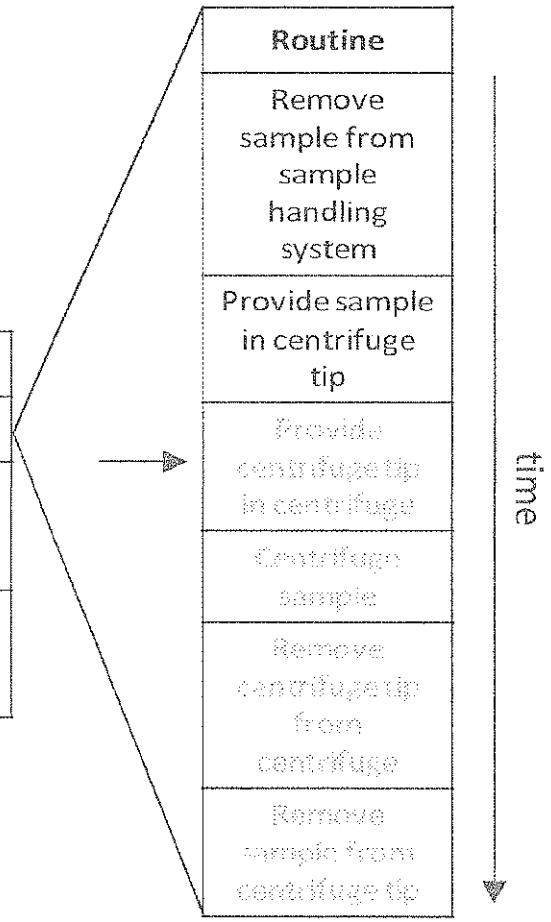


FIG. 45A

Sequence No.	Processing state
1	Centrifuge sample
2	Perform cytometry on sample
3	Conduct agglutination assay on sample

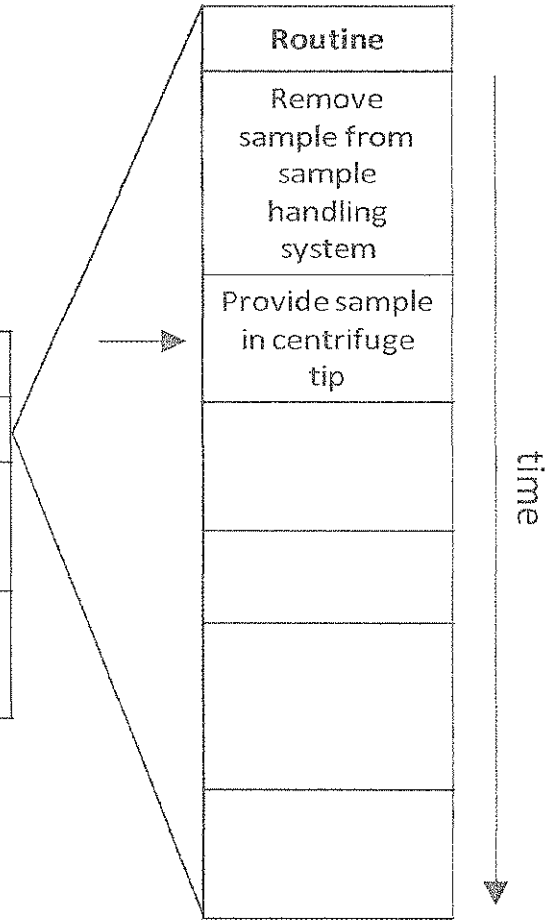


FIG. 45B

Sequence No.	Processing state
1	Centrifuge sample
2	Perform cytometry on sample
3	Conduct agglutination assay on sample

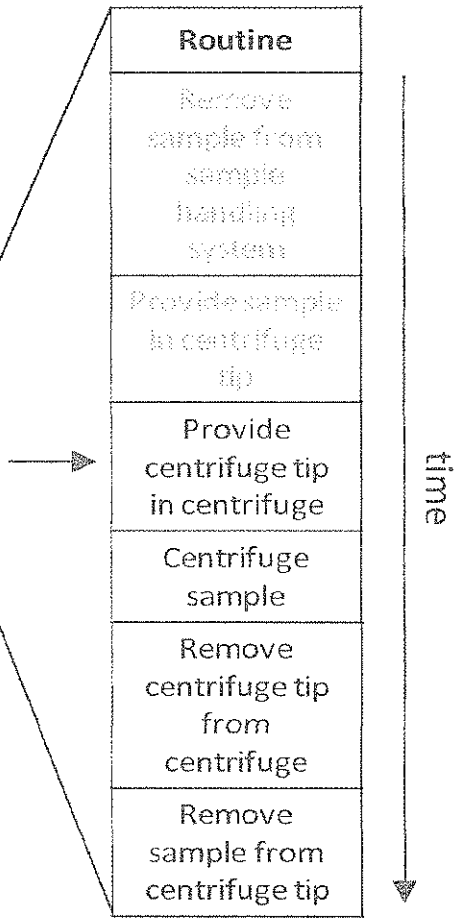


FIG. 45C

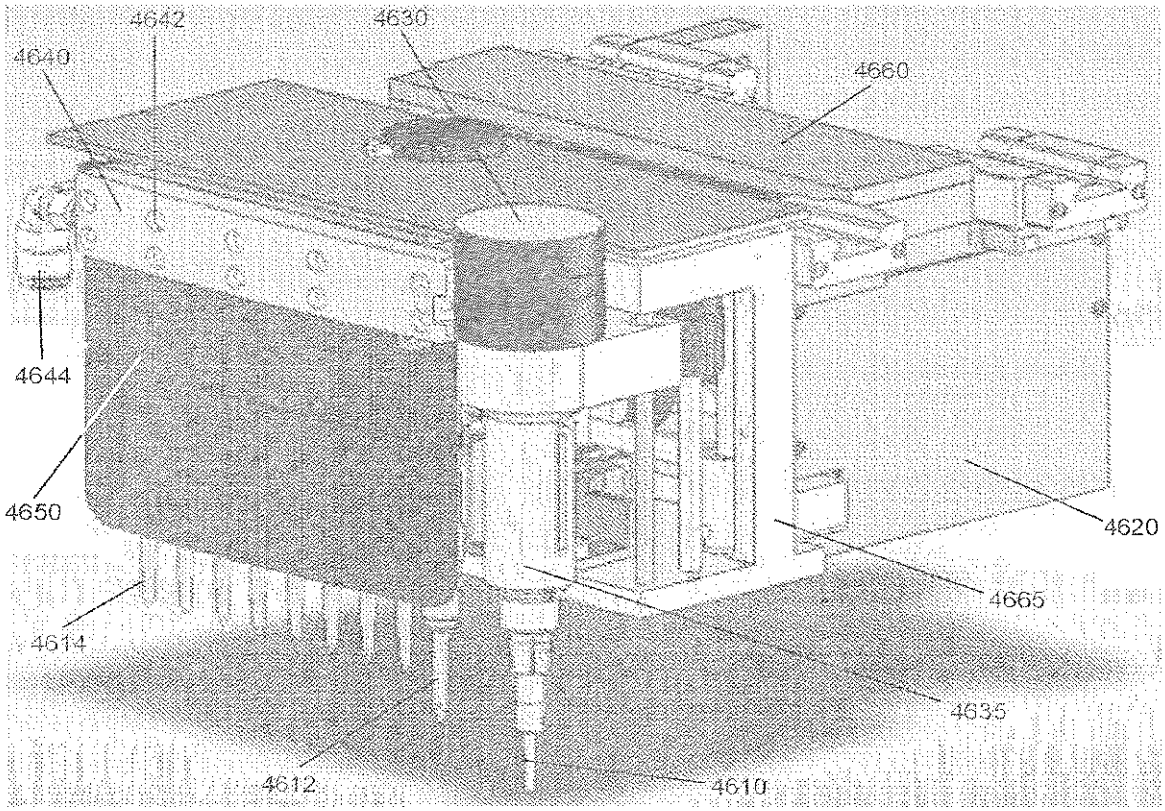


FIG. 46

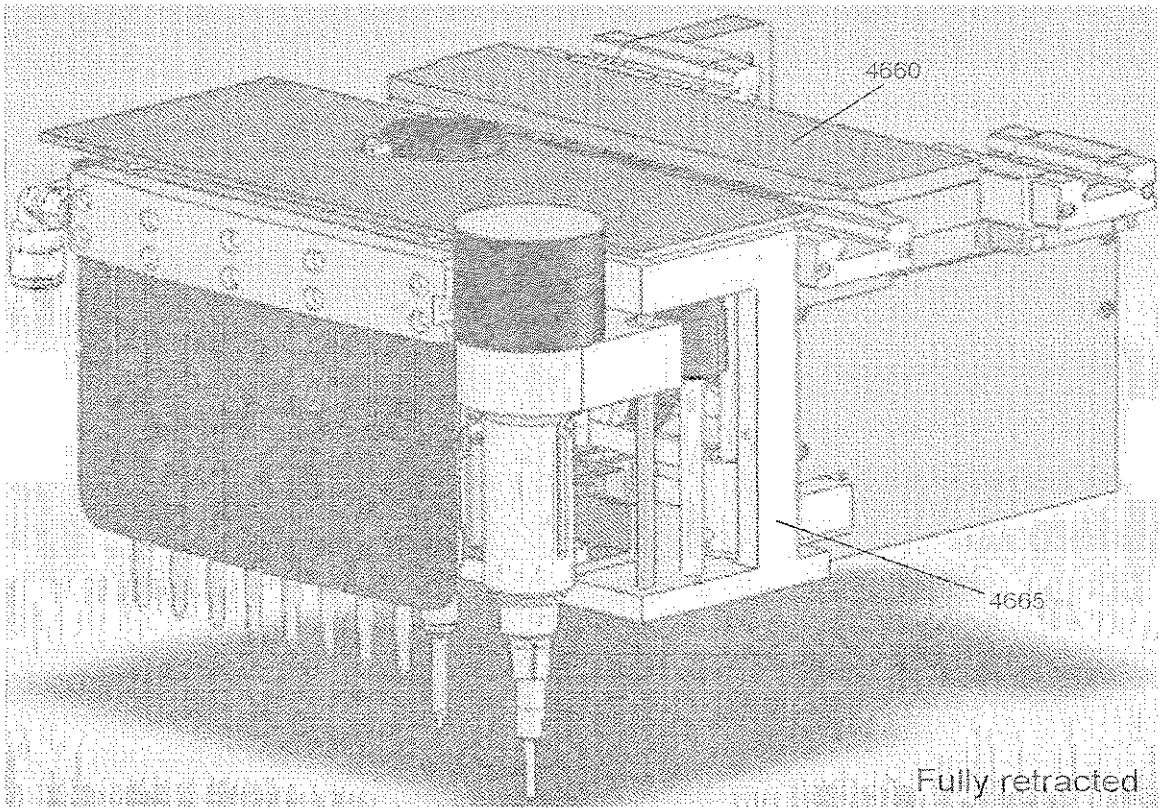


FIG. 46A

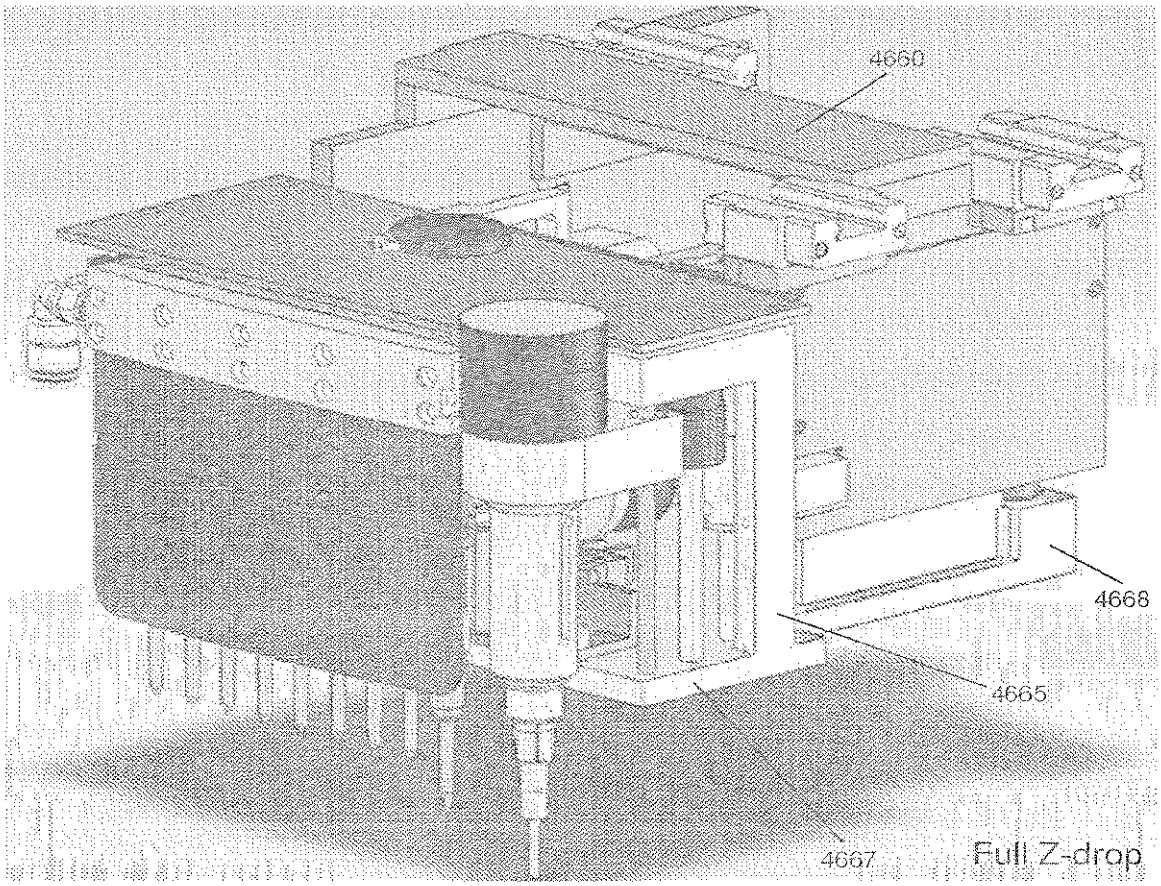


FIG. 46B

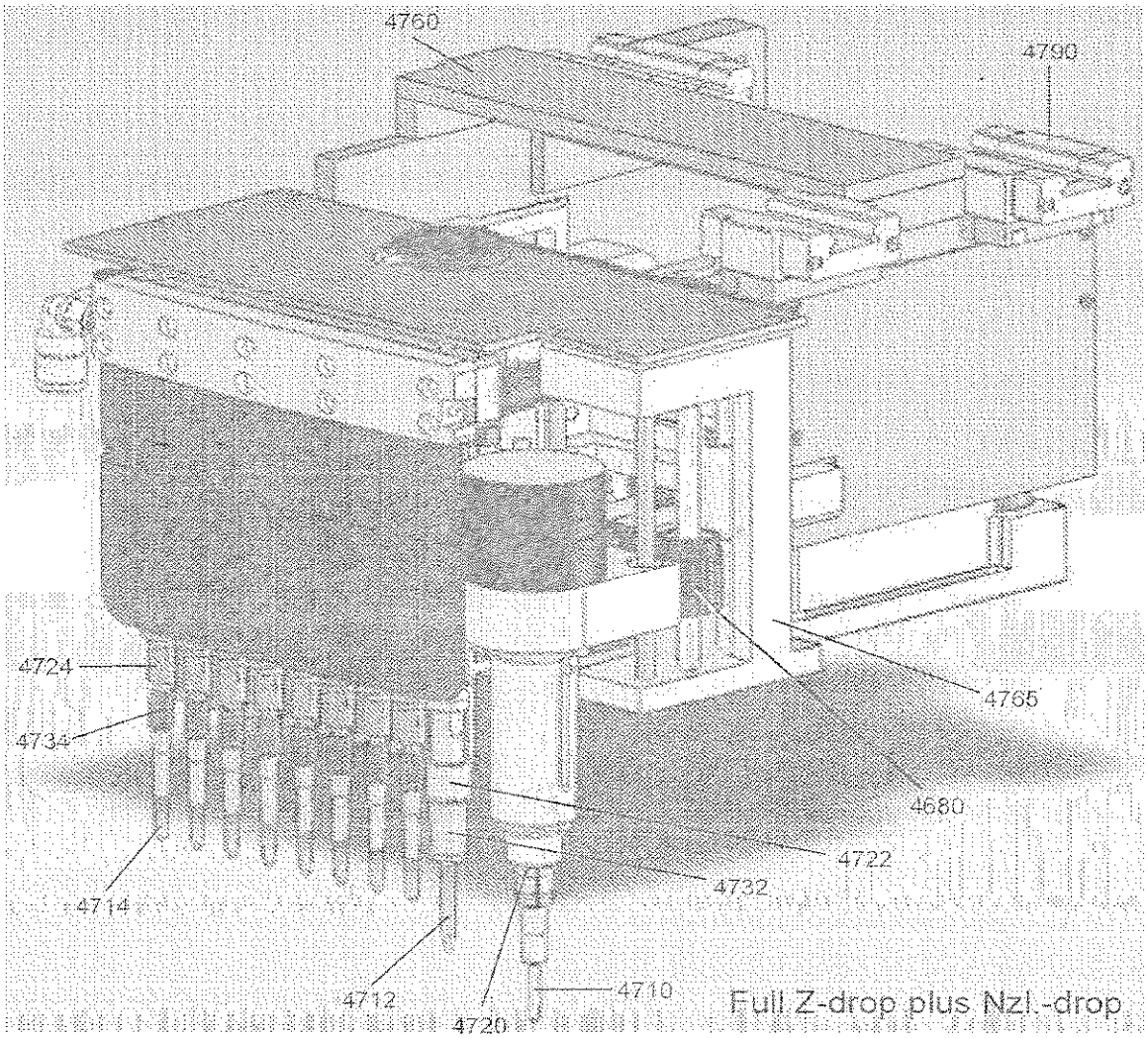

4760
4790
4724
4734
4765
4680
4722
4732
4714
4712
4720
4710
Full Z-drop plus Nzl.-drop

FIG. 47

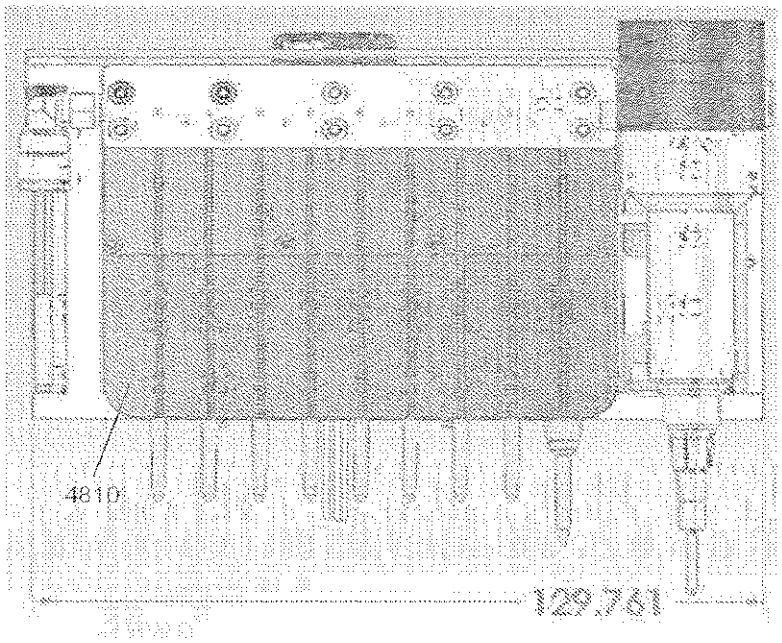


FIG. 48

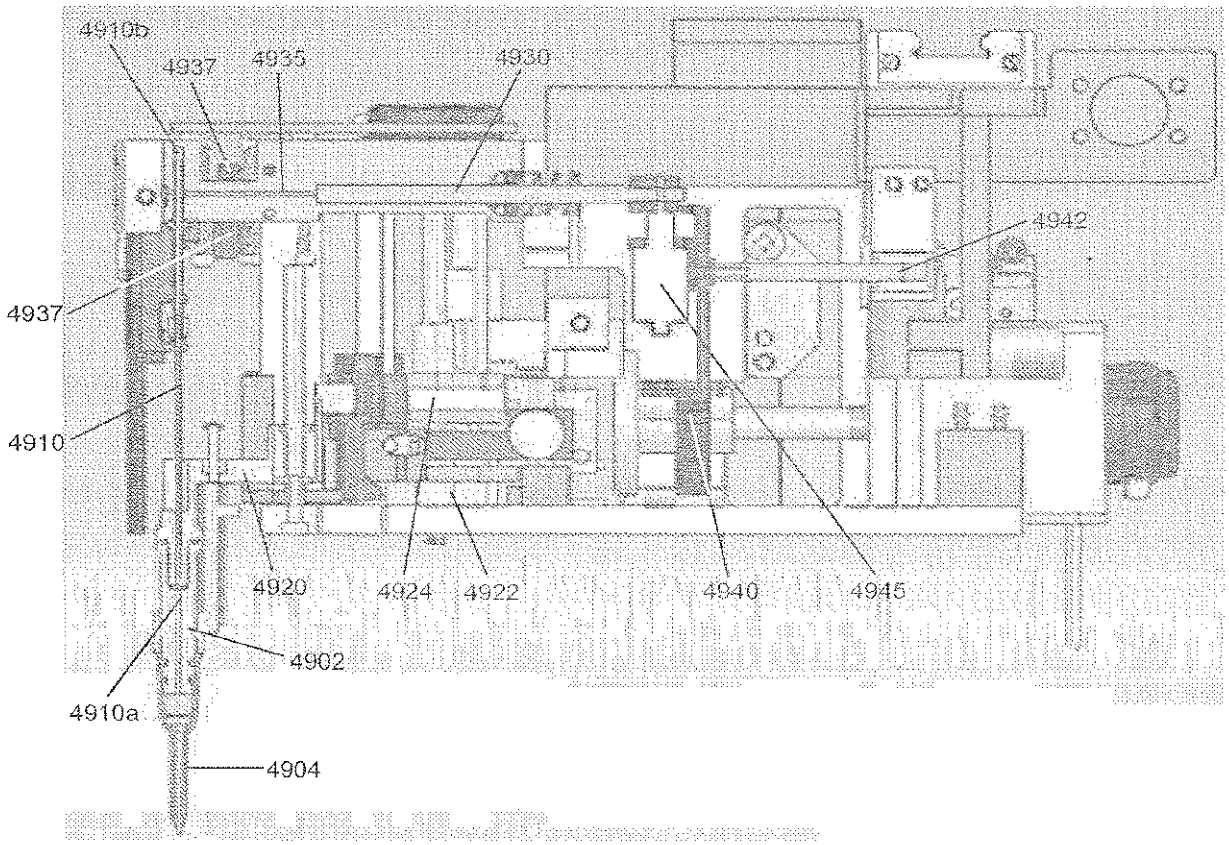

4910b
4937
4935
4930
4942
4937
4910
4920
4924
4922
4940
4945
4902
4910a
4904

FIG. 49

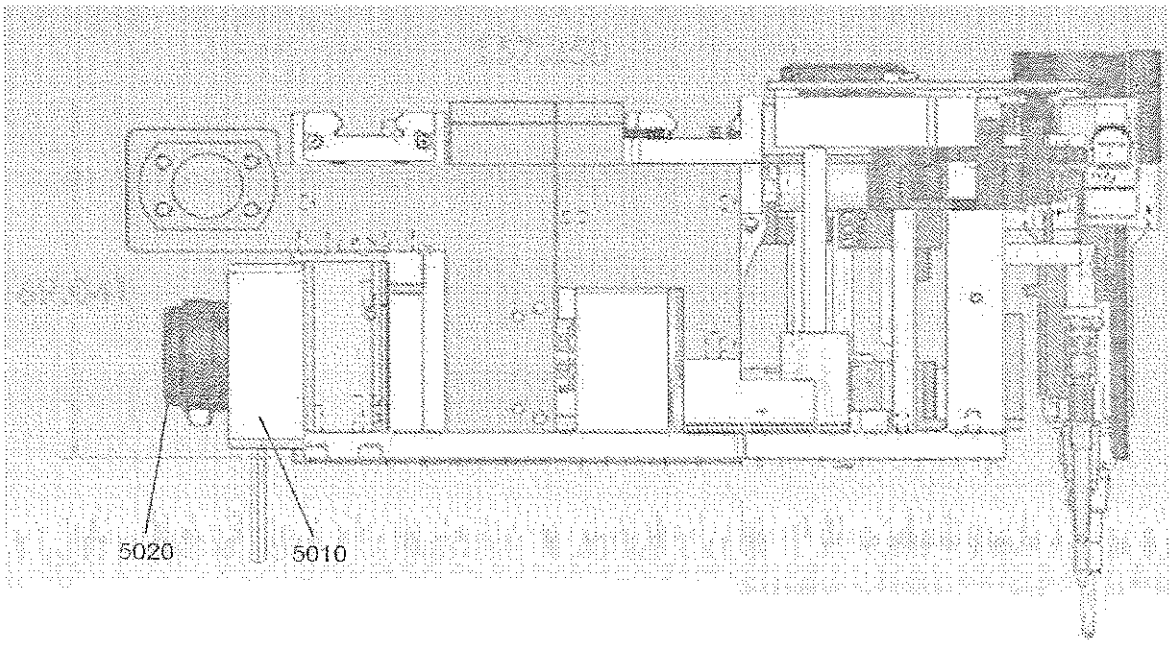


FIG. 50

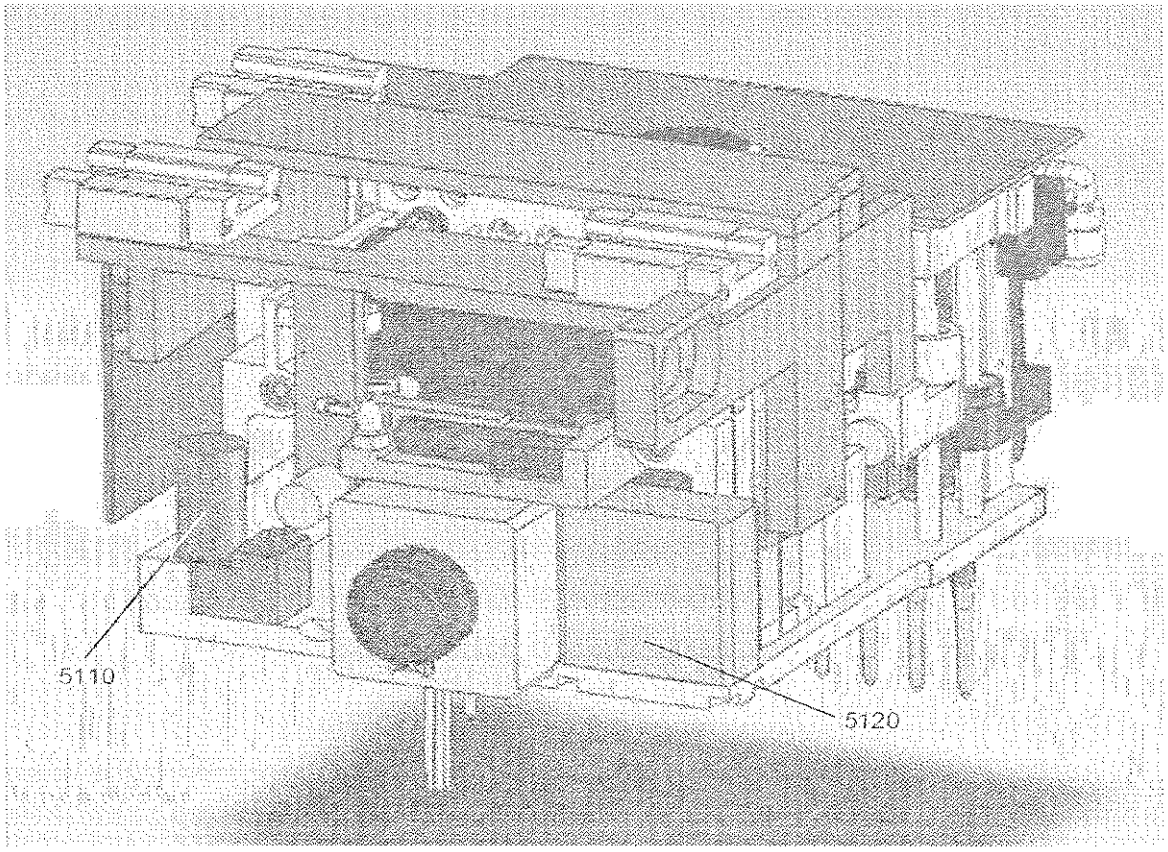


FIG. 51

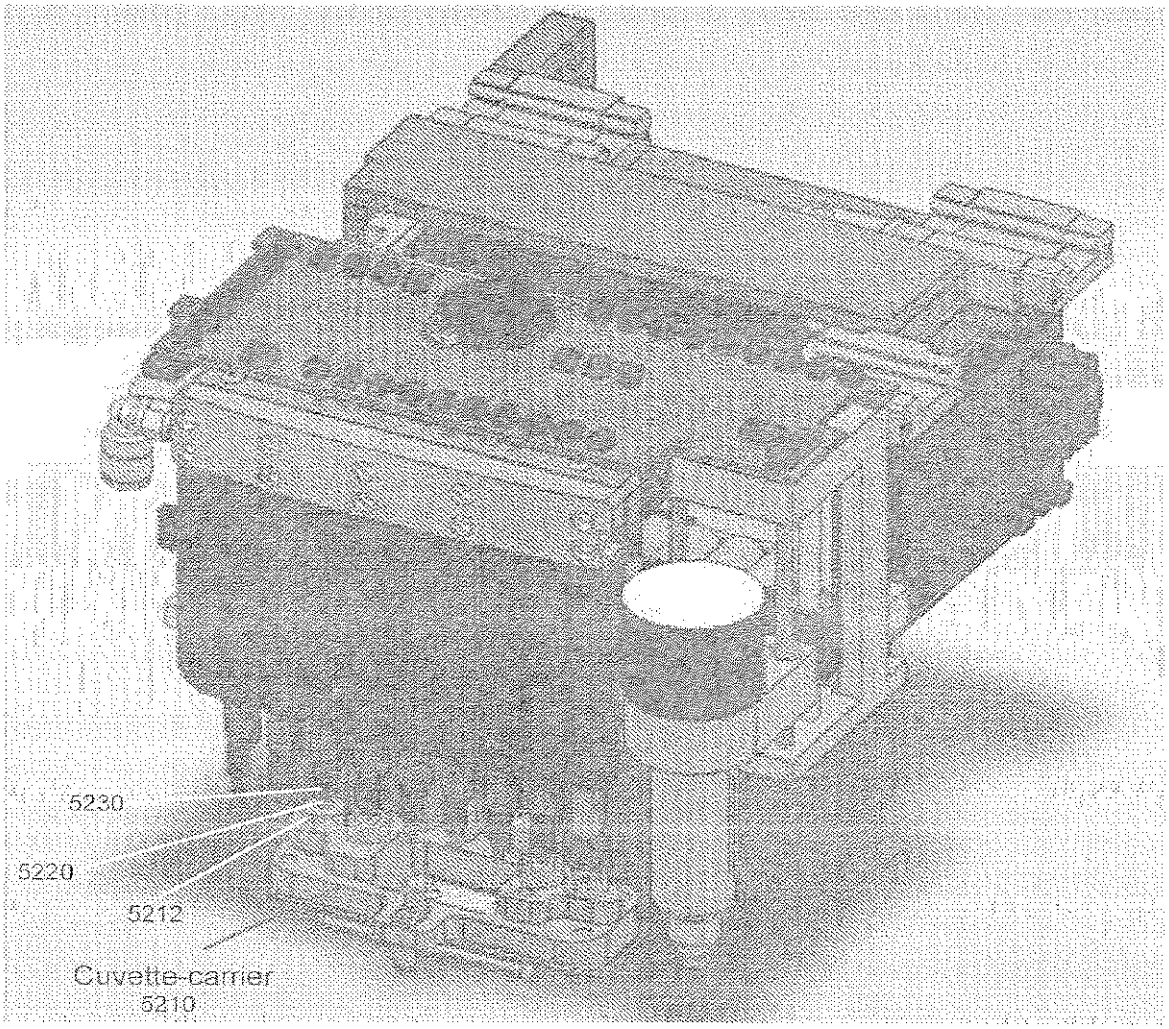


FIG. 52

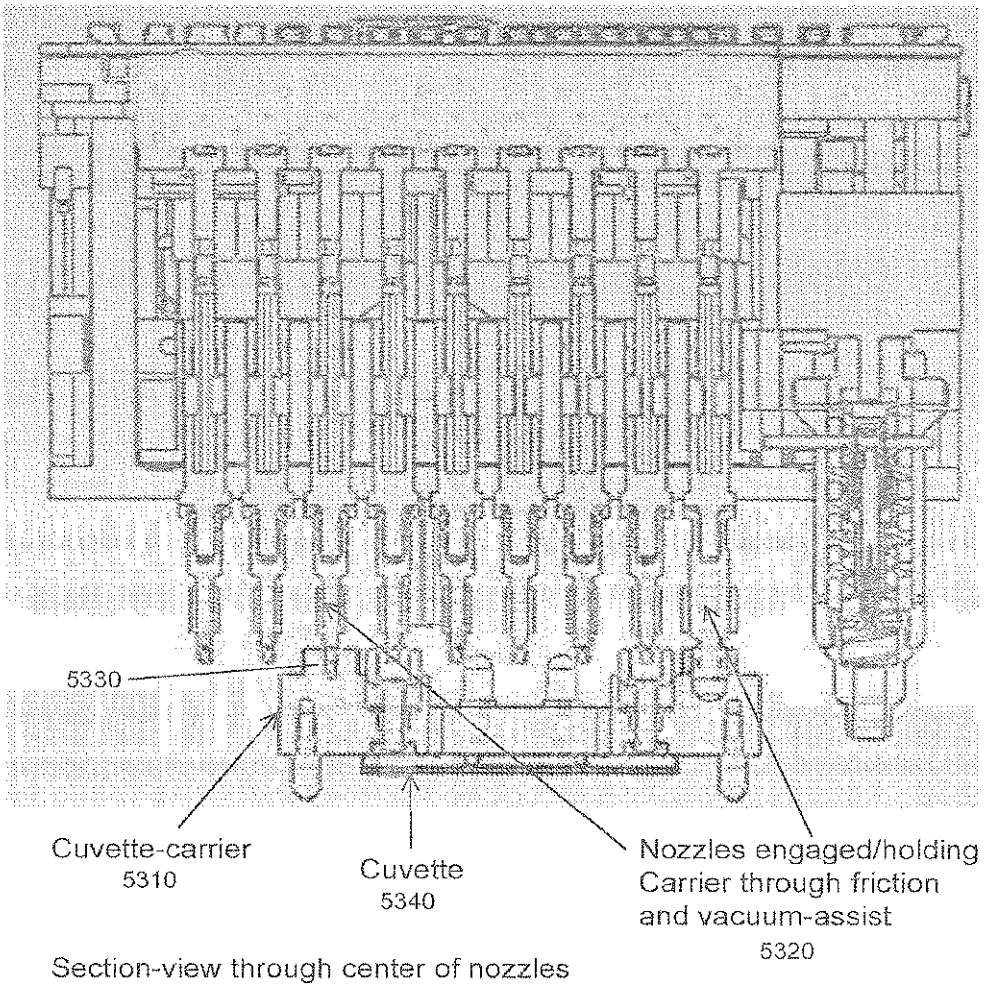

5330
Cuvette-carrier
5310
Cuvette
5340
Nozzles engaged/holding
Carrier through friction
and vacuum-assist
5320
Section-view through center of nozzles

FIG. 53

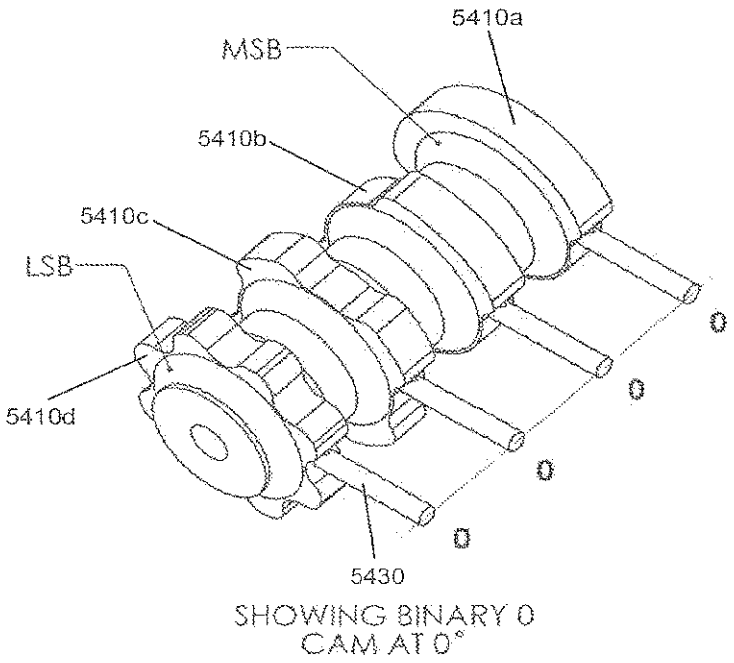
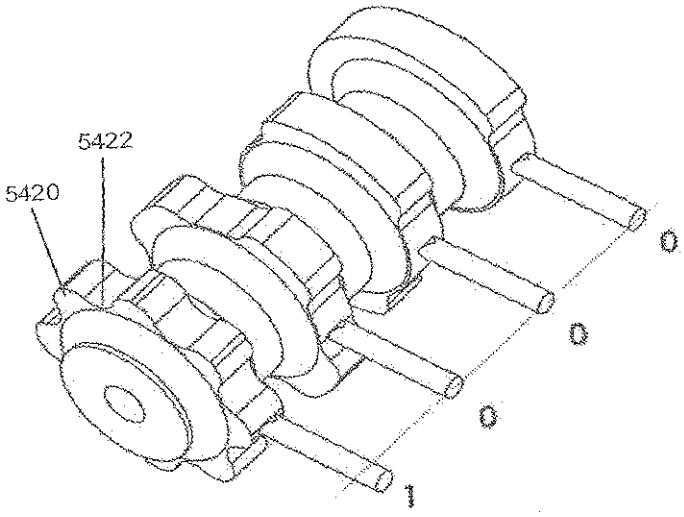
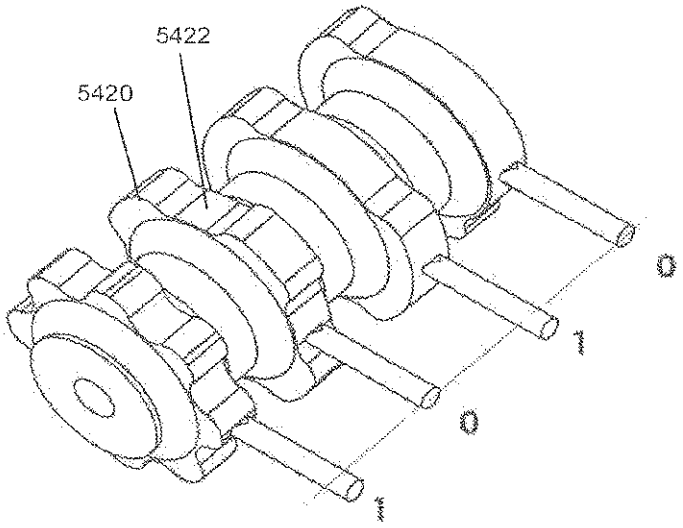

5410a
MSB
5410b
5410c
LSB
5410d
0
0
0
0
5430
SHOWING BINARY 0
CAM AT 0°

FIG. 54A



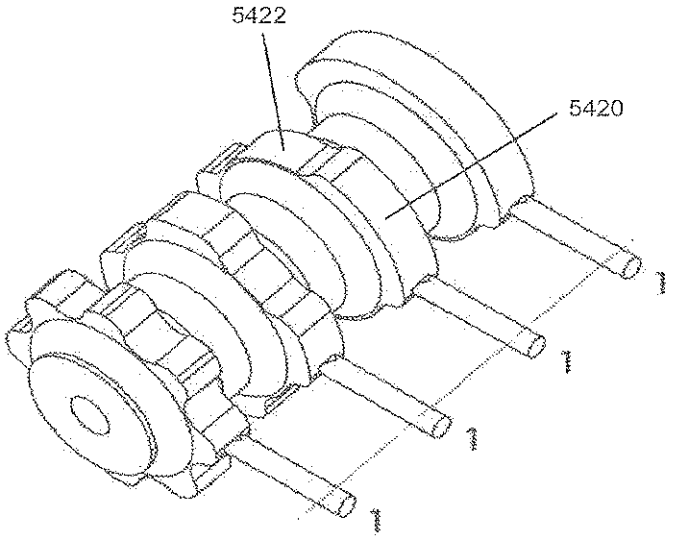
SHOWING BINARY 1
CAM AT 22.5°

FIG. 54B



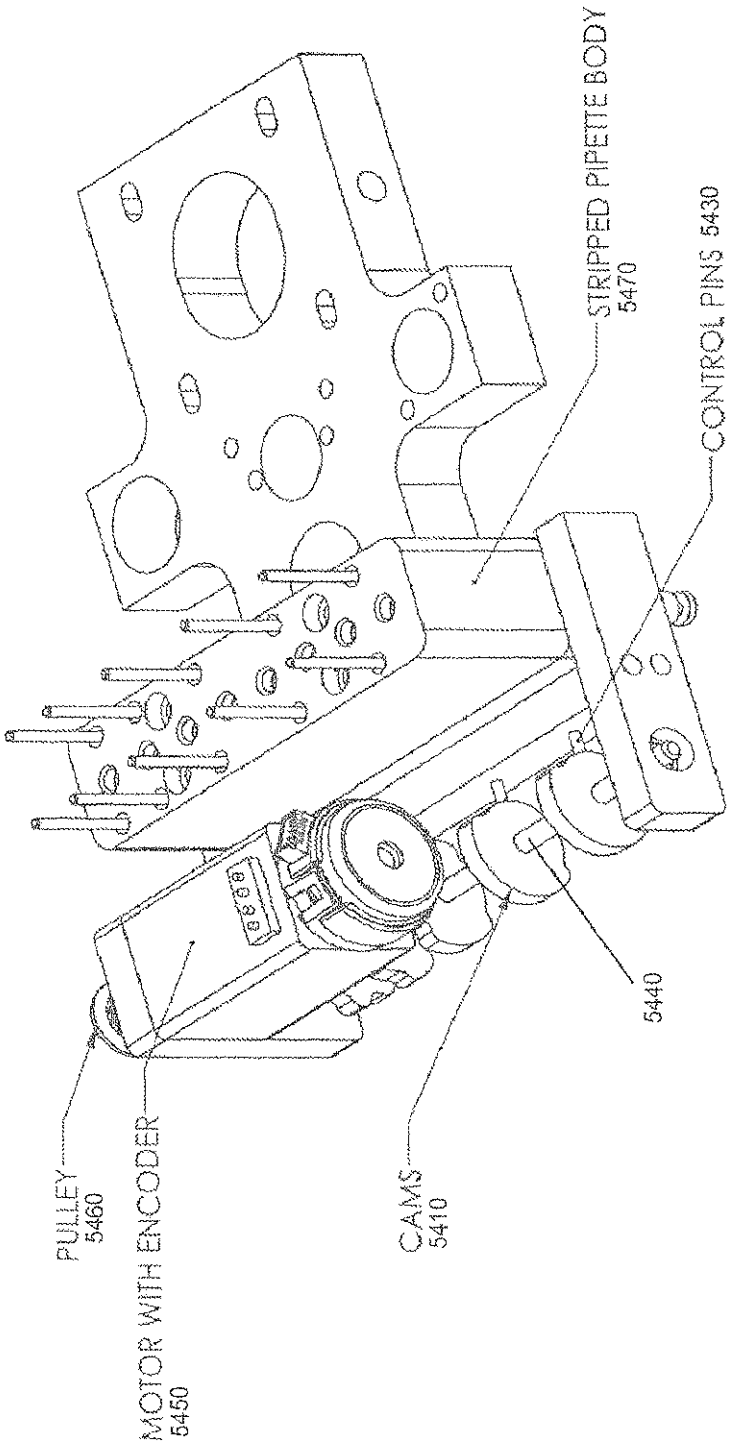
SHOWING BINARY 5
CAM AT 112.5°

FIG. 54C



SHOWING BINARY 15
CAM AT 337.5°

FIG. 54D



SELECTION CAM MOUNTED WITH MOTOR

FIG. 54E

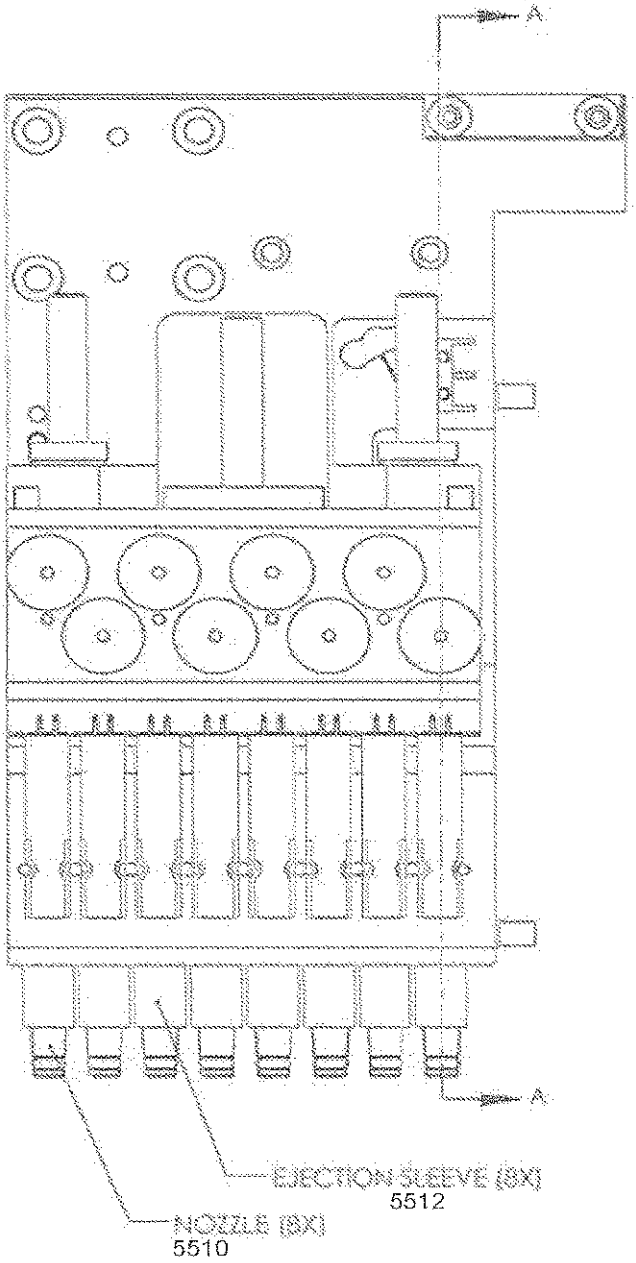


FIG. 55A

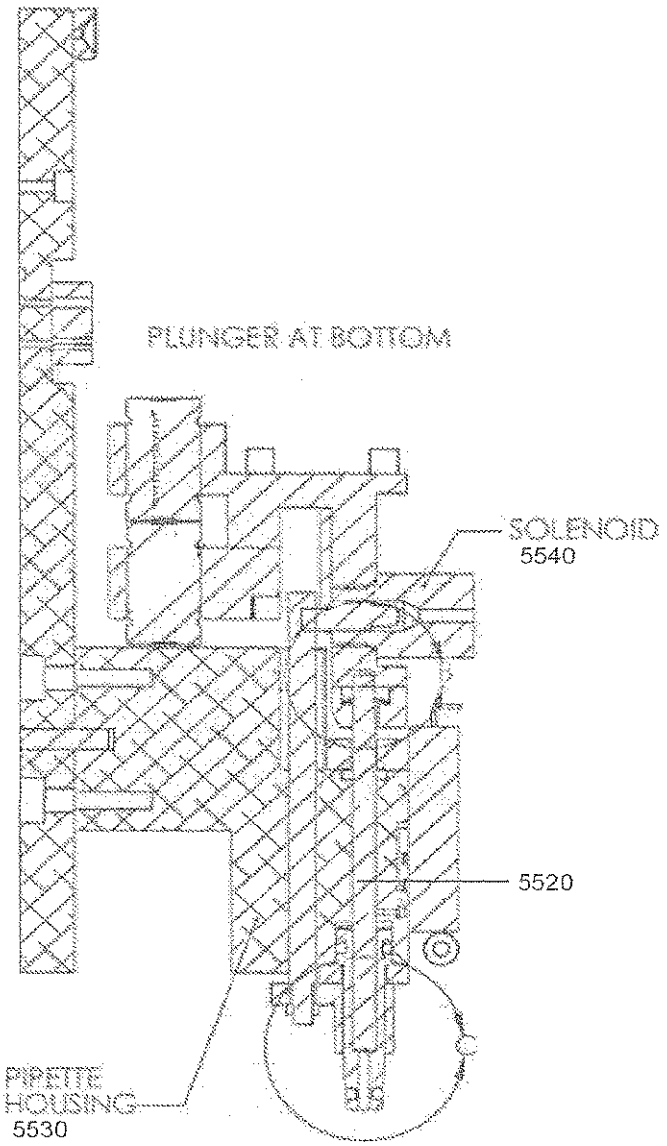

PLUNGER AT BOTTOM
SOLENOID
5540
5520
PIPETTE
HOUSING
5530
SECTION A-A
SCALE 1 : 1

FIG. 55B

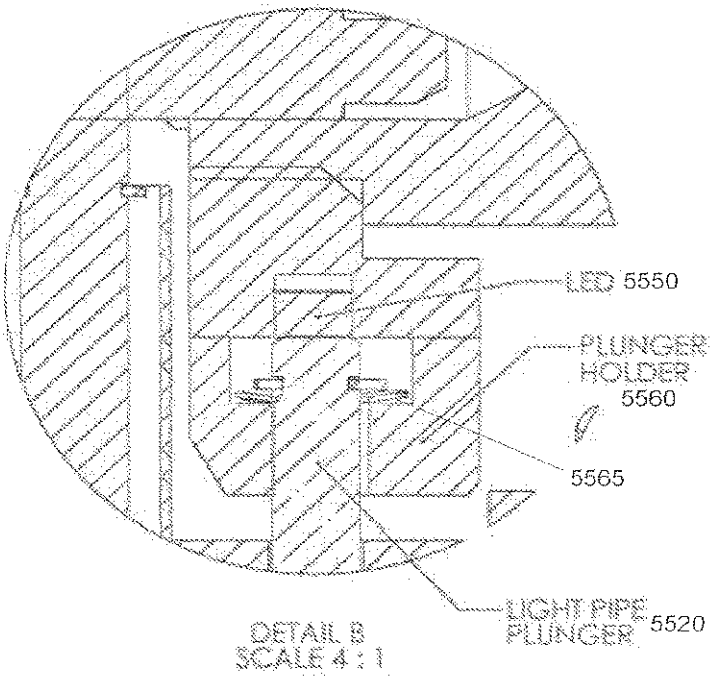

LED 5550
PLUNGER HOLDER 5560
5565
LIGHT PIPE PLUNGER 5520
DETAIL B
SCALE 4 : 1

FIG. 55C

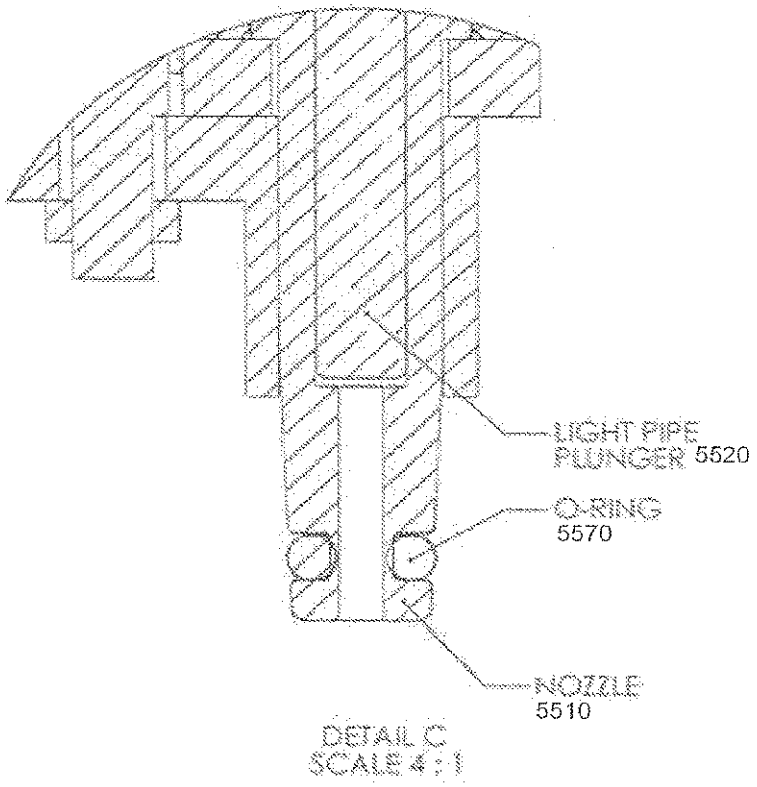

LIGHT PIPE PLUNGER 5520
O-RING 5570
NOZZLE 5510
DETAIL C
SCALE 4 : 1

FIG. 55D

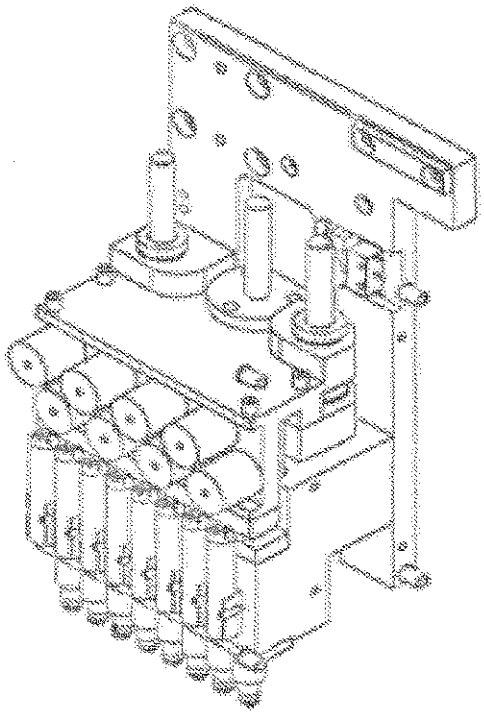


FIG. 55E

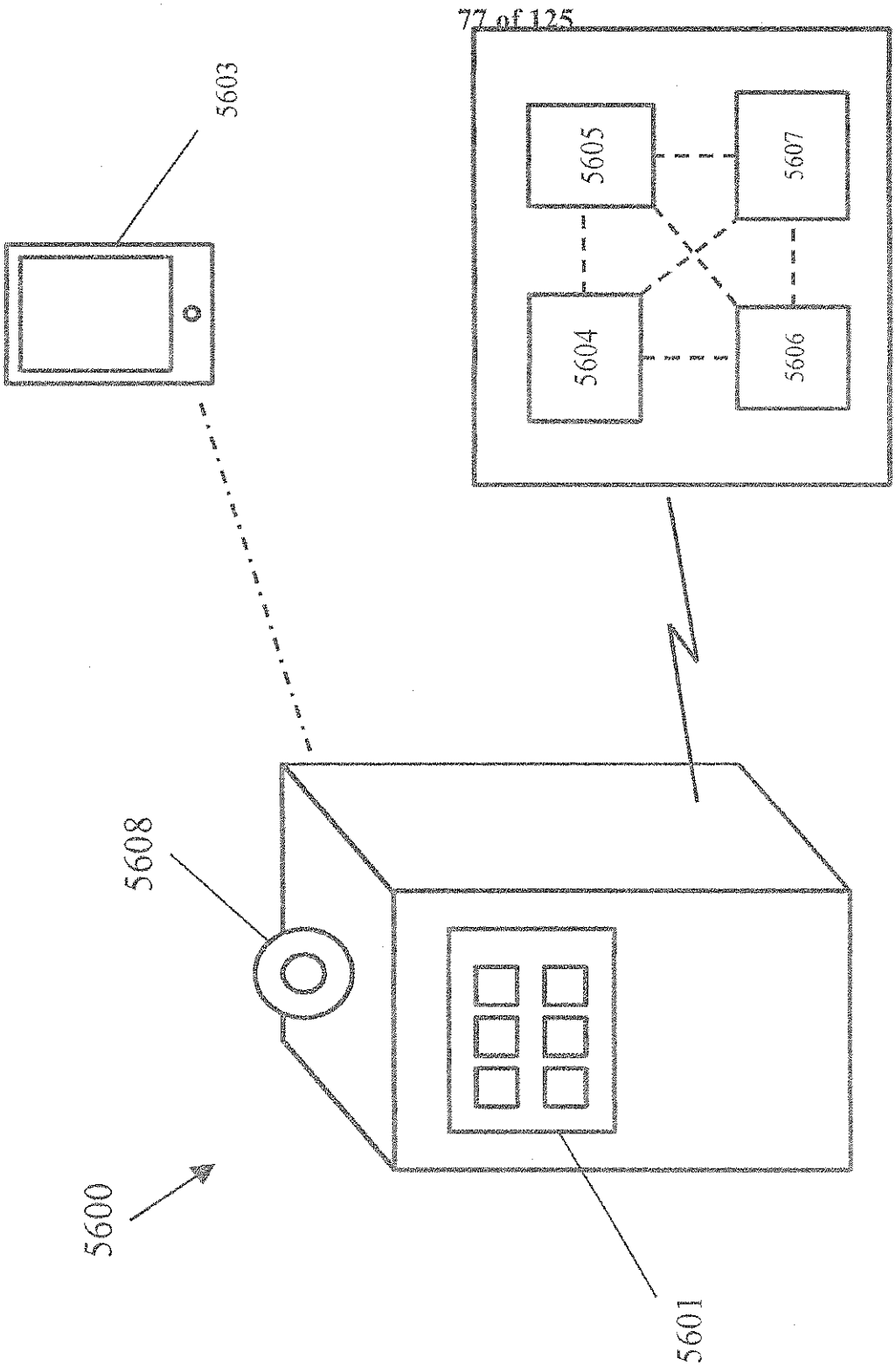


FIG. 56

Examples of sample processing with blood	Examples of sample processing with urine	Examples of sample processing with feces	Examples of sample processing with others
		Weighing or volume measurement of sample	Weighing or volume measurement of sample
Anticoagulation EDTA Heparin Citrate Oxalate Other			
Separation of formed elements (red cells, white cells and platelets) from plasma Centrifugation Filtration Magnetic removal of selected cells Density gradient centrifugation Ficoll Hypaque Gradient Elutriation Other	Separation and concentration of cells (Bacteria) Centrifugation	Dispersion/dissolution of solid matter Addition of buffer Mechanical mixing	Dispersion/dissolution of solid matter Addition of buffer Mechanical mixing
Physical removal of plasma, cells, lysate Use of pipette Other			
Concentration of selected cells Centrifugation Magnetic selection Other		Concentration of selected cells Centrifugation Magnetic selection Other	Concentration of selected cells Centrifugation Magnetic selection Other
Coagulation (produces serum) Removal of red cells and fibrin clot by centrifugation Separation using a serum separator (gel plug which allows only serum to pass)			

FIG. 57

Examples of sample processing with blood	Examples of sample processing with urine	Examples of sample processing with feces	Examples of sample processing with others
Processing of formed elements			
Lysis of red cells (provides a hemolysate)			
Lysis of all formed elements			
Fixation of white cells (to prevent lysis)			
Dilution (and mixing)	**Dilution (and mixing)**	**Dilution (and mixing)**	**Dilution (and mixing)**
Dilution of blood			
Dilution of plasma			
Dilution of serum			
Physical processes	**Physical processes**	**Physical processes**	**Physical processes**
Heating	Heating	Heating	Heating
Cooling	Cooling	Cooling	Cooling
Mixing	Mixing	Mixing	Mixing
Addition of reagent(s)	**Addition of reagent(s)**	**Addition of reagent(s)**	**Addition of reagent(s)**
Liquid	Liquid	Liquid	Liquid
Solid	Solid	Solid	Solid
Removal of interfering factors	**Removal of interfering factors**	**Removal of interfering factors**	**Removal of interfering factors**
Precipitation and centrifugation	Precipitation and centrifugation	Precipitation and centrifugation	Precipitation and centrifugation
Flocculation	Flocculation	Flocculation	Flocculation
Coacervation	Coacervation	Coacervation	Coacervation
Denaturation	Denaturation	Denaturation	Denaturation
Extraction	Extraction	Extraction	Extraction
Concentration of analyte on solid phase	**Concentration of analyte on solid phase**	**Concentration of analyte on solid phase**	**Concentration of analyte on solid phase**
Magnetic	Magnetic	Magnetic	Magnetic
Affinity	Affinity	Affinity	Affinity

FIG. 57 Con't.

Example of sample processing with blood	Example of sample processing with urine	Example of sample processing with feces	Example of sample processing with others
Preparation of a cell smear	**Preparation of a cell smear**	**Preparation of a smear**	**Preparation of a smear**
Measurements used subsequently to process assay data Measurement of sample volume Measurement of hematocrit	**Measurements used subsequently to process assay data** Measurement of sample volume	**Measurements used subsequently to process assay data** Measurement of sample volume	**Measurements used subsequently to process assay data** Measurement of sample volume
Measurement of sample optical properties	Measurement of sample optical properties	Measurement of sample optical properties	Measurement of sample optical properties
Aspiration of subsamples for use in different types of assay Pipette	**Aspiration of subsamples for use in different types of assay** Pipette	**Aspiration of subsamples for use in different types of assay** Pipette	**Aspiration of subsamples for use in different types of assay** Pipette
Extraction and concentration of nucleic acids Cell lysis Adsorption of nucleic acid onto a solid phase Elution of nucleic acid from solid phase	**Extraction and concentration of nucleic acids** Cell lysis Adsorption of nucleic acid onto a solid phase Elution of nucleic acid from solid phase	**Extraction and concentration of nucleic acids** Cell lysis Adsorption of nucleic acid onto a solid phase Elution of nucleic acid from solid phase	**Extraction and concentration of nucleic acids** Cell lysis Adsorption of nucleic acid onto a solid phase Elution of nucleic acid from solid phase

FIG. 57 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
Measurement types					
Optical					
	Imaging				
		Gross	(RGB)		
		Microscopic			
			Bright field		
			Dark field		
			Fluorescence		
			Luminescence		
		Video			
		Particle-size measurement	Cell size measurement		
		Particle distribution measurement	Agglutination		
		Particle movement measurement			
	Imaging means	Camera			
		CCD			
		Scanner			
	Spectrometry/spectroscopy				
		UV			
		Visible			
		IR			
		Raman			
		Transmission			
		Absorbance			

FIG. 58

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
		Fluorescence			
		Single or limited wavelength measurements			
		Difference spectrometry			
		Colorimetry			
		Measurement of spectra			
		Refractometry			
		Reflectometry			
		Polarimetry		FP	
		Turbidimetry			
		Nephelometry			
		Aggregometry			
		Light scattering measurement			
		Luminometry			
			Bioluminescence		
			Chemiluminescence		
			Electrochemiluminescence	ECL	
			Phosphorescence		
		Optical rotatory dispersion		ORD	
		Circular dichroism		CD	
		Scintillation counting			
		Scintillation proximity			
		Evanescent Wave		EW	
		Surface plasmon resonance		SPR	
		Fluorescence resonance energy transfer		FET	

FIG. 58 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
		Time-resolved FET		HTRF	
		Electron-spin resonance		ESR	
		Mass spectrometry		MS	
		Nuclear magnetic resonance		NMR	
Physical, other than optical					
	Electrophoresis				
		Capillary			
		Polyacrylamide			
		Agarose gel			
		Isoelectric focusing			
		Isotachophoresis			
		Mobility shift			
	Chromatography				
		Size exclusion			
		Ion-exchange			
		Affinity			
		Hydrophobic			
	Sedimentation				
		Under gravity	Erythrocyte sedimentation rate	ESR	
	Centrifugation				
		Sedimentation velocity			

FIG. 58 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
		Sedimentation equilibrium			
		Gradient centrifugation			
			Sucrose		
			Ficoll-Hypaque		
Classification by analyte type	Small molecule				
		Drug	Therapeutic drug monitoring	TDM	
		Cardiac active drug		CAD	Digoxin
		Anti-epileptic drug		AED	Valproic acid
		Anti-neoplastic drug		AND	Methotrexate
		Anti-microbial drug		AMD	Gentamycin
		Anti-viral drug			
		Illicit drug	Drugs of abuse in urine	DAU	Tetrahydrocanabanol
		Modified drugs			
			Glycosylated		
			Sulfated		
			Oxidized		
			Hydroxylated		
		Prostaglandins			Thromboxane
		Hormone			T3
		Toxin			
		Metabolite			Cholesterol
		Ion			Mg2+
		pH			
		Dissolved gas	Blood (Oximetry)		O2

FIG. 58 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
		Advanced glycosylation end products		AGEs	
	Macromolecule				
		Drug			
		Peptide			Humanized antibody
		Hormone			
		Cell stimulating factor			VEGF
		Protein	Binding factor		Haptoglobin
			Enzyme		CKMB
			Coagulation factor		Factor VIII
		Antibody			
		Antigen			
		Tumor antigen			CEA
		Carbohydrate			
		Nucleic acid			
			DNA		
			RNA		
		Modified proteins			
			Hemoglobin A1c	HbA1c	
			Glycated albumin		
			Bence-Jones proteins		
			Deamidated enzymes		
			Proteolytic fragments		
			Phosphorylated proteins		
			Glycated proteins		
		Molecular complexes			
		Lipids			

FIG. 58 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
			High density lipoprotein	HDL	
			Low density lipoprotein	LDL	
			Very Low density lipoprotein	VLDL	
			Chylomicrons		
		Troponin isoforms			
				TNI:TNC	(Many others)
	Functional activities				
		Complement			
		Coagulation		PT	
			Prothrombin time		
			Activated partial thromboplastin time	APTT	
			Bleeding time		
		Clot lysis			
		Iron-binding capacity			
		T4-uptake			
		Rheumatoid factor		RF	
		Anti-nuclear antibodies		ANA	
	Cells and infectious agents				
	Infectious agent	Virus			
		Bacterium			
		Yeast			
		Fungus			
		Parasite			

FIG. 58 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
	Human cell				
		Red cell			
		Reticulocyte			
		White cell			
			B-cell		
			T-cell		
			Macrophage		
			Lymphocyte		
			Leukocyte		
			Basophil		
			Neutrophil		
			Eosinophil		
			Dendritic cell		
			Plasma cell		
			Natural killer cell		
			Tumor cell		
	Physical property				
		Viscosity			
		Density			
		Osmolarity			
		Tonicity			
		pH			
		Ionic strength			
		Refractive index			
	Gross sample characteristic				

FIG. 58 Con't.

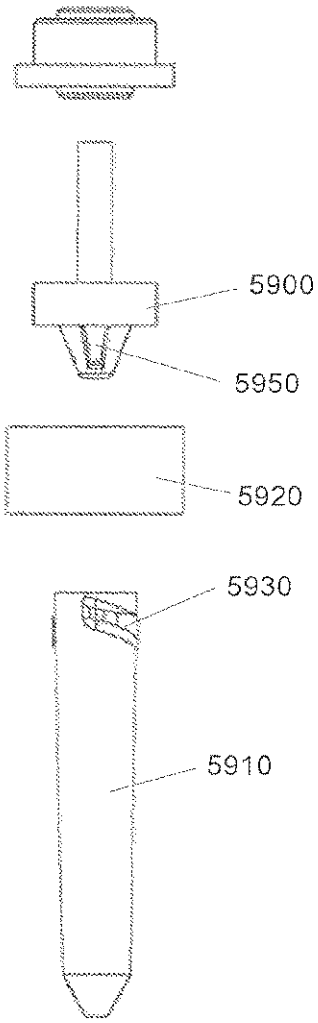
Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
		Hemolysis			
		Lipemia			
		Icteria			
		Turbidity			
		Total protein concentration			
Classification by assay method					
	Complexiметry				
	Stoichiometric conversion				
	Receptor-based (competitive)				
		Radioimmunoassay		RIA	
		Enzyme immunoassay		EIA	EMIT, CEDIA
		Fluorescence immunoassay		FIA	
	Receptor-based (non-competitive)				
		Immunoradiometric assay		IRMA	
		Enzyme linked immunosorbent assay		ELISA	
		Polymerase chain reaction		PCR	Many other
		Reverse-transcription-PCR		RT-PCT	
		Fluorescence activated cell sorting		FACS	
		Flow cytometry (counting)			

FIG. 58 Con't.

Measurement and assay classes	Class	Sub-class	Sub-sub-class	Acronym	Examples
		Cell image analysis			
Classification by protocol					
	Rate				
	End-point				
	Approach to end-point				
	Single analyte				
	Multiplexed analyte measurement				Luminex
	Thermocycling				
	Isothermal			PCR	Taq-man
				LAMP	

FIG. 58 Con't.

WO 2013/052318 PCT/US2012/057155



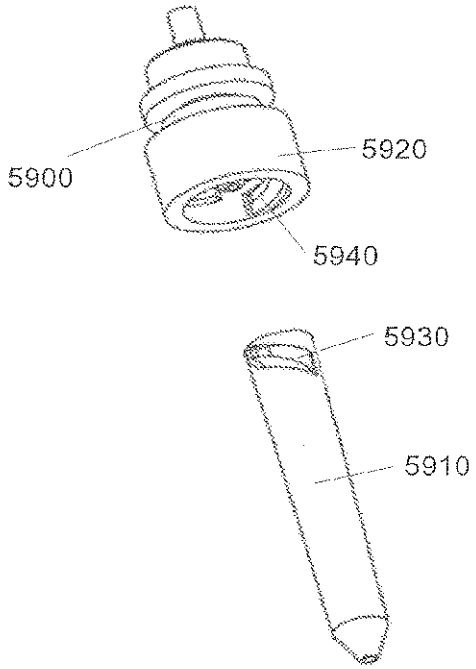


FIG.59

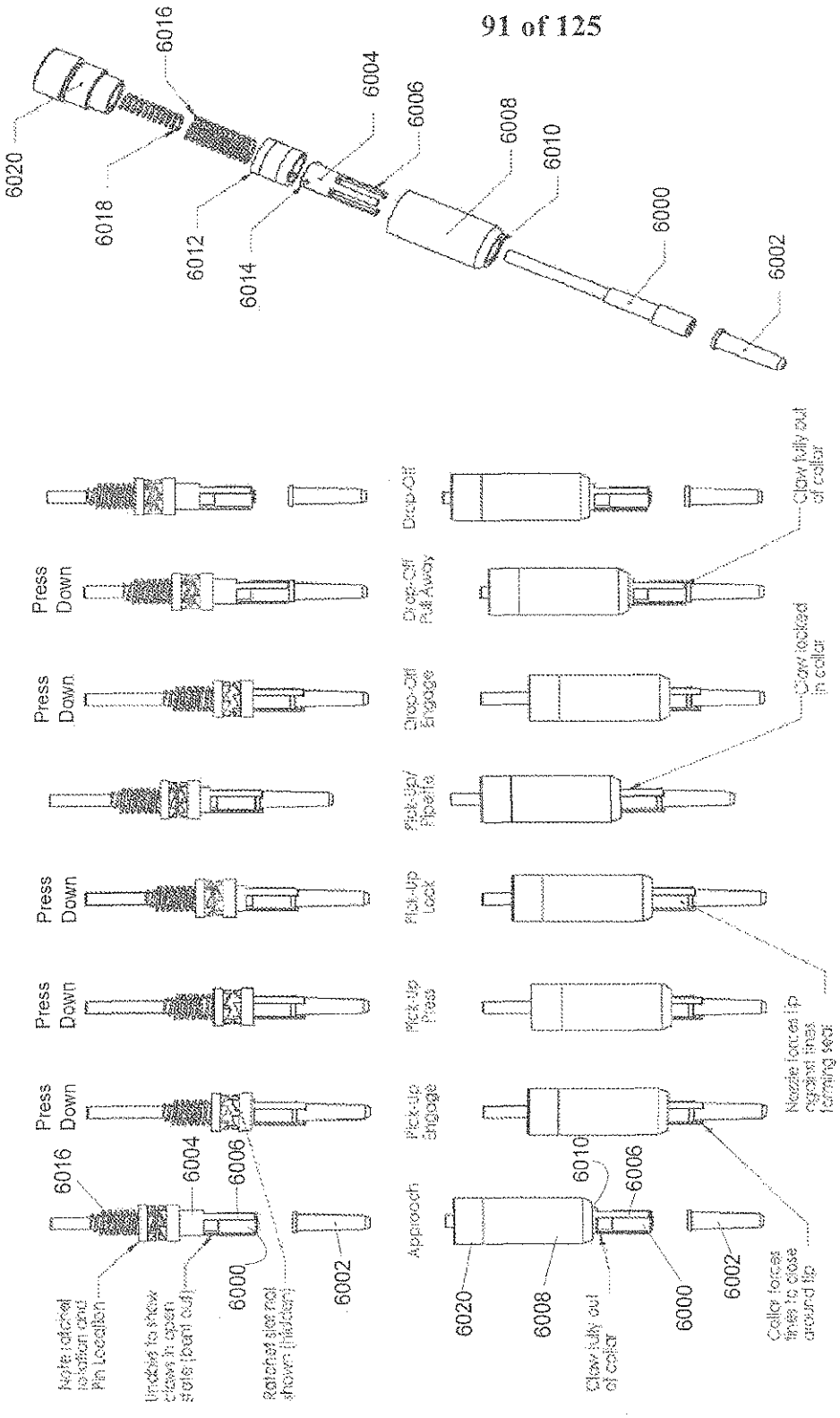

6020
6016
6018
6012
6014
6004
6006
6008
6010
6000
6002
Press Down
Drop-Off
Drop-Off Pull Away
Drop-Off Engage
Pick-Up/ Ripette
Pick-Up Lock
Pick-Up Press
Pick-Up Engage
Approach
Claw fully out of collar
Claw locked in collar
Nozzle forces tip against inner forming wall
Collar forces tines to close around tip
Note: Internal notation and Pin Location
Undone to show claws in open state (part cut)
Ratchet slot not shown (hidden)

FIG. 60

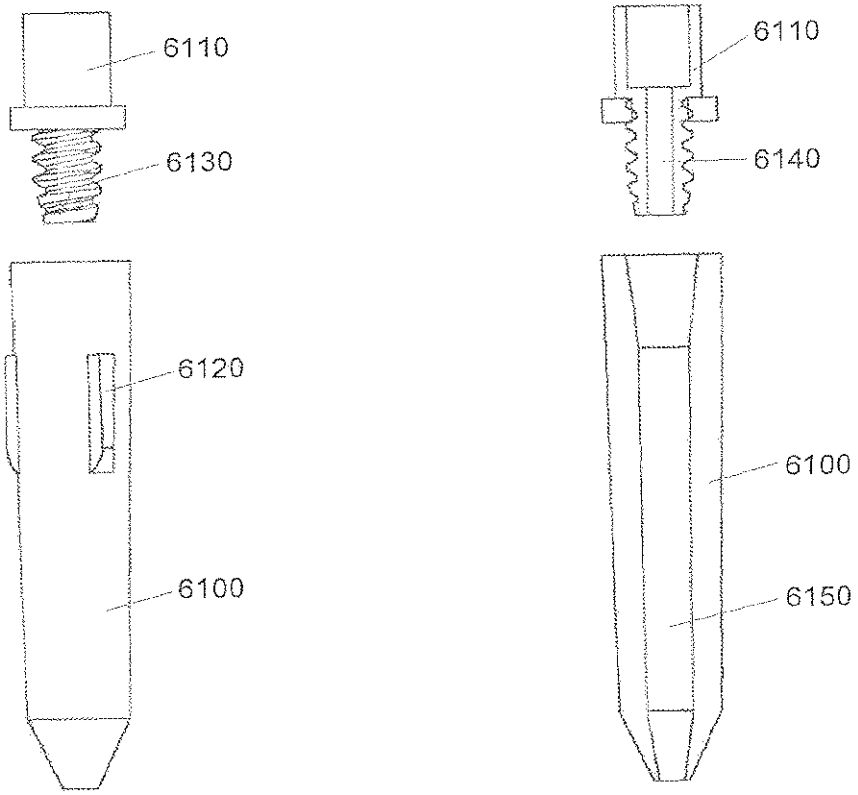


FIG. 61

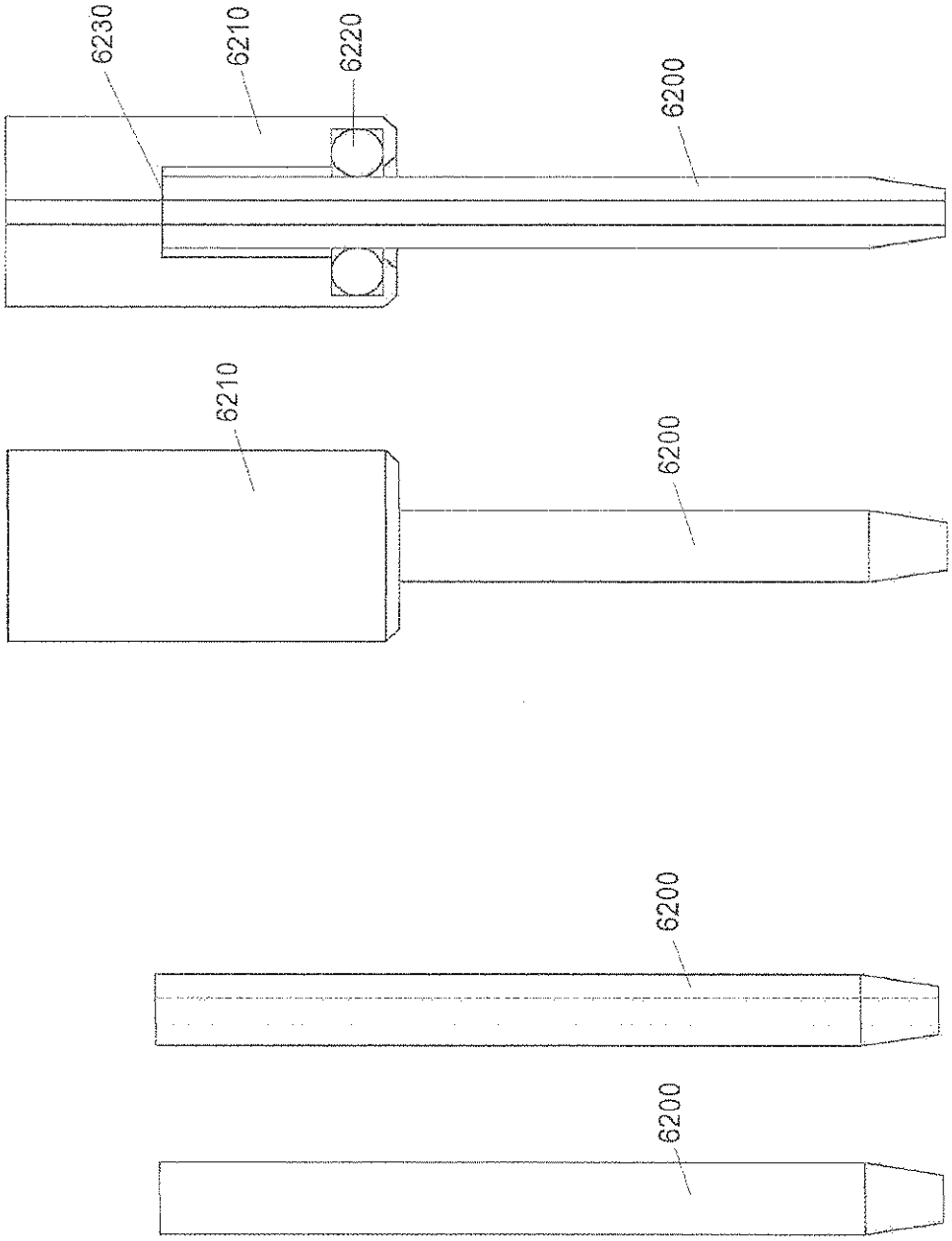


FIG. 62

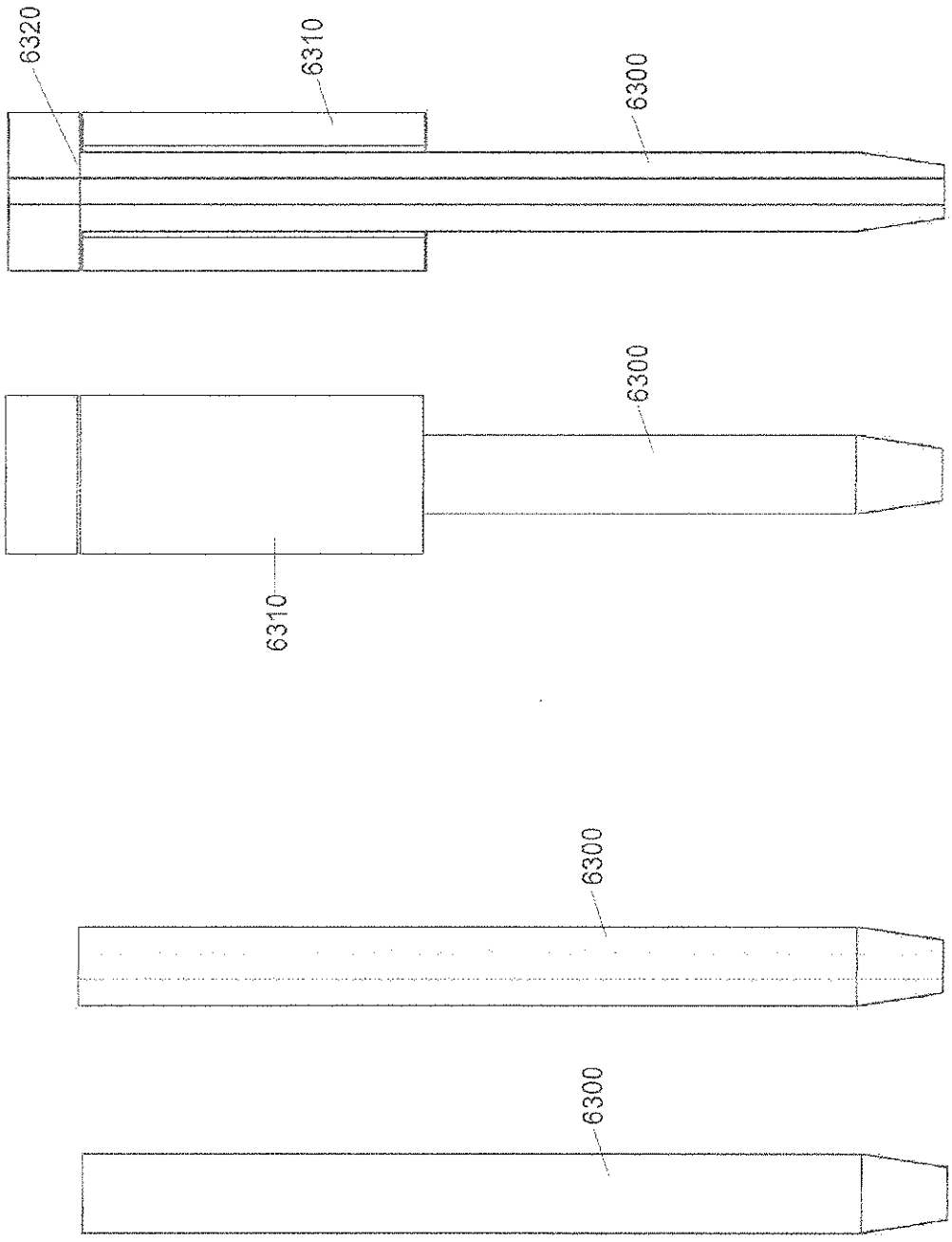


FIG. 63

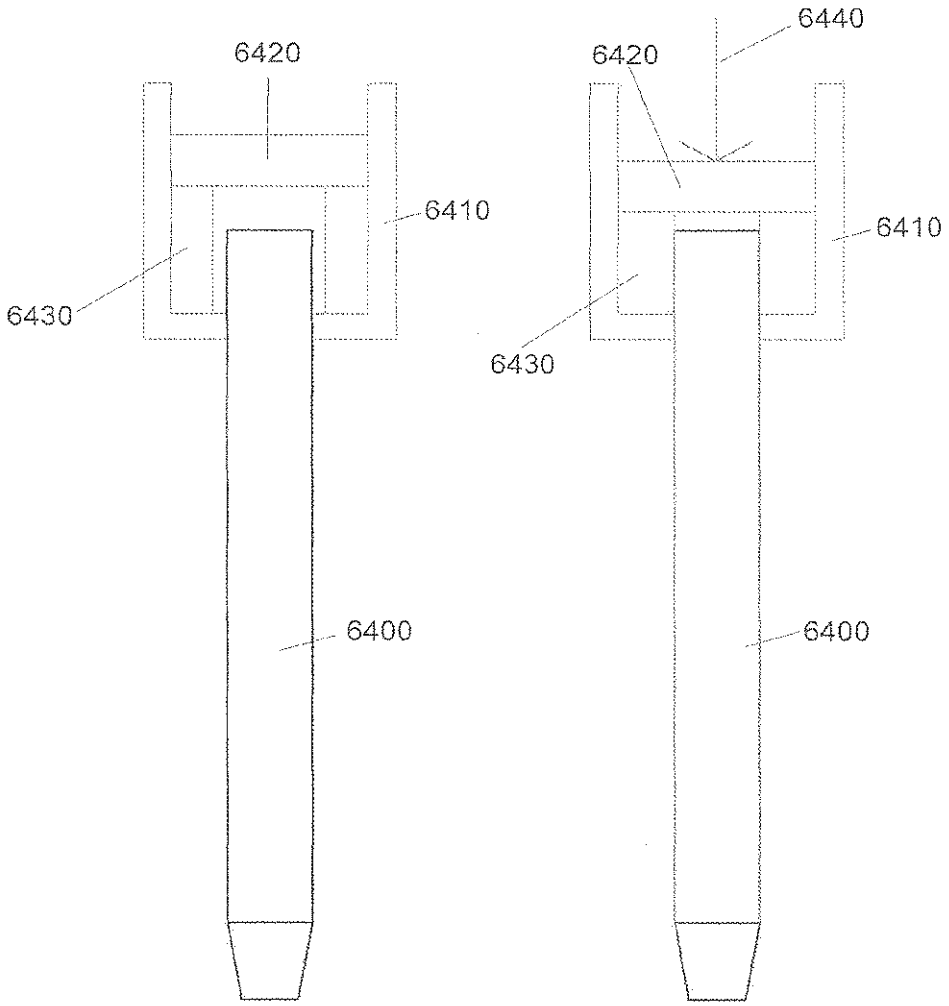


FIG. 64

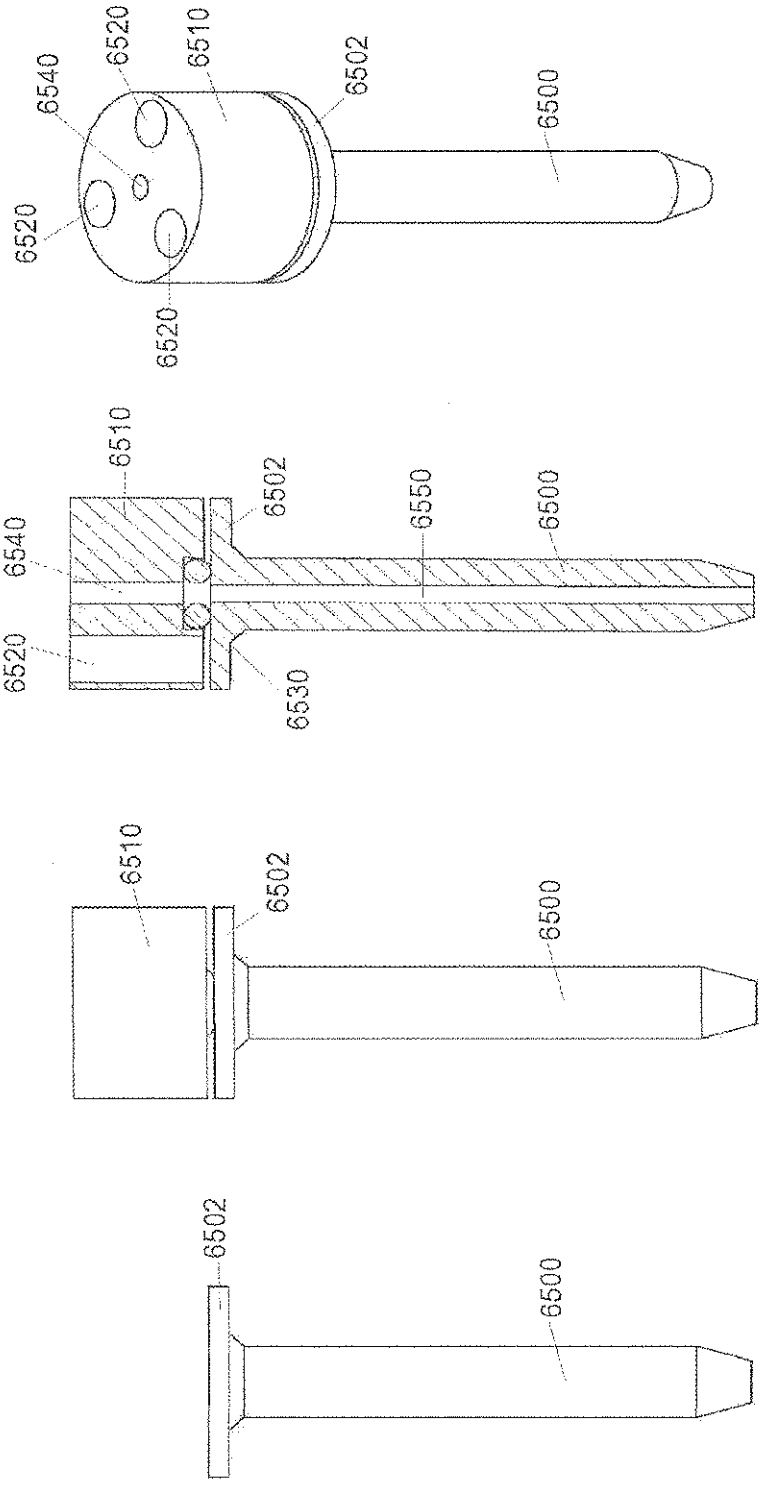

6540
6520
6520
6520
6510
6502
6500
6510
6502
6550
6500
6540
6520
6530
6510
6502
6500
6502
6500

FIG. 65

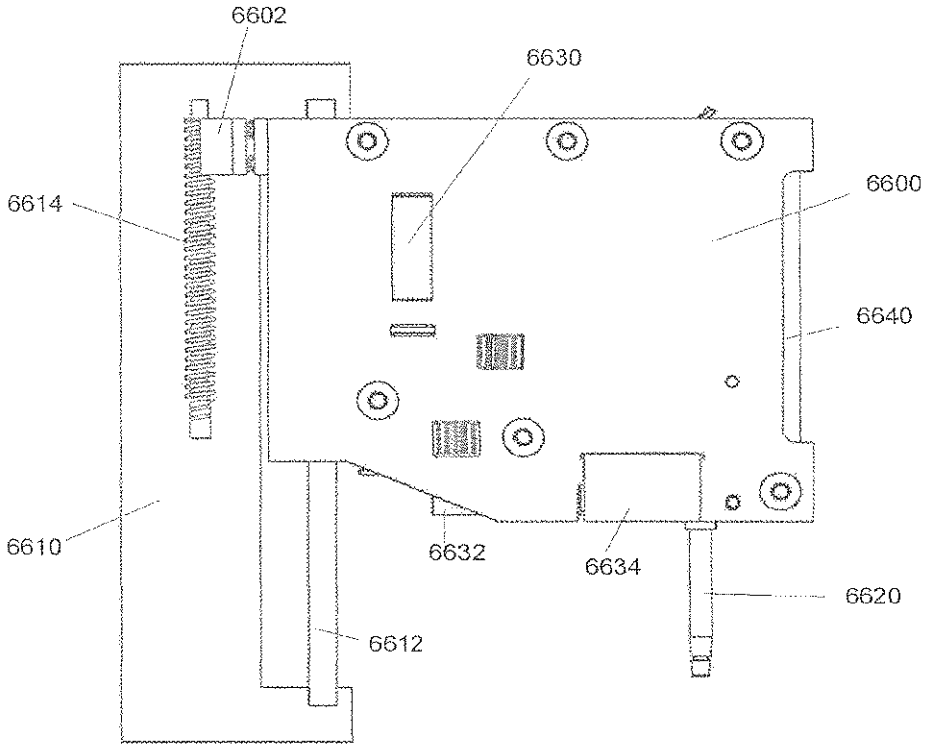


FIG. 66

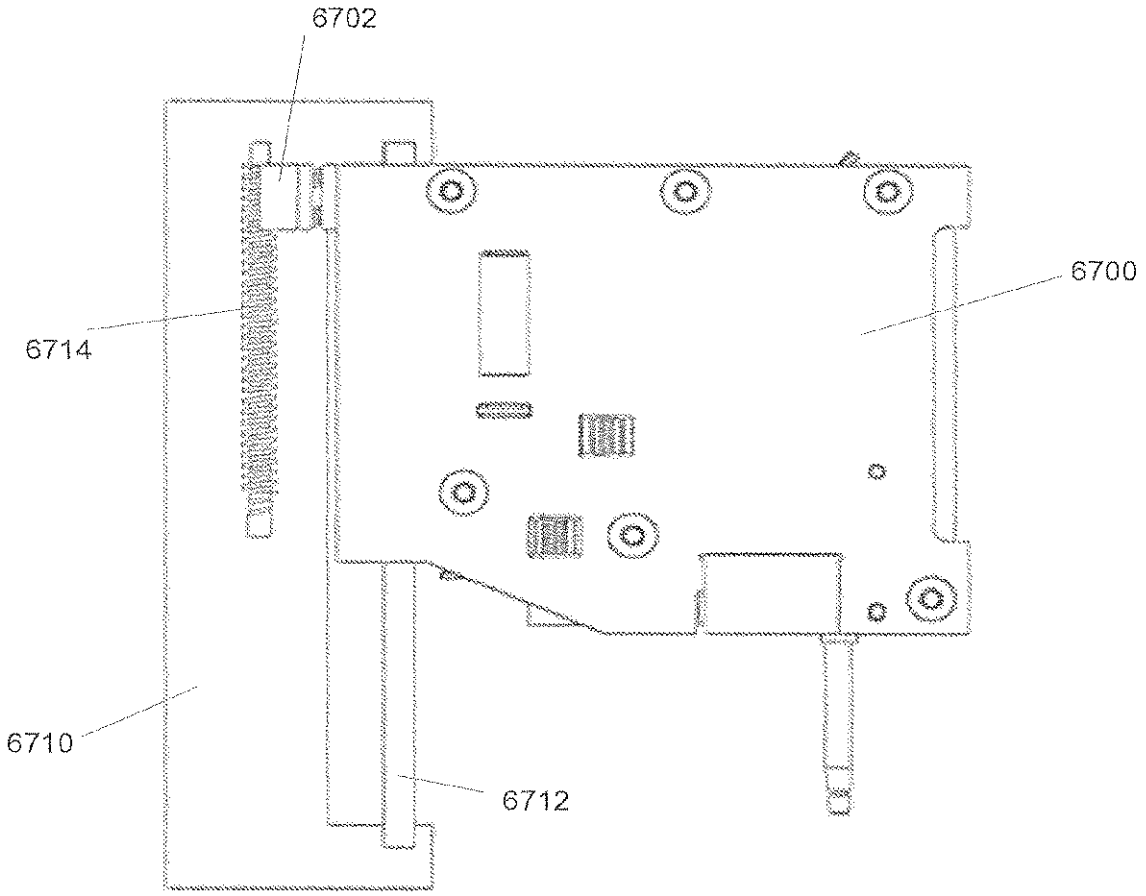


FIG. 67A

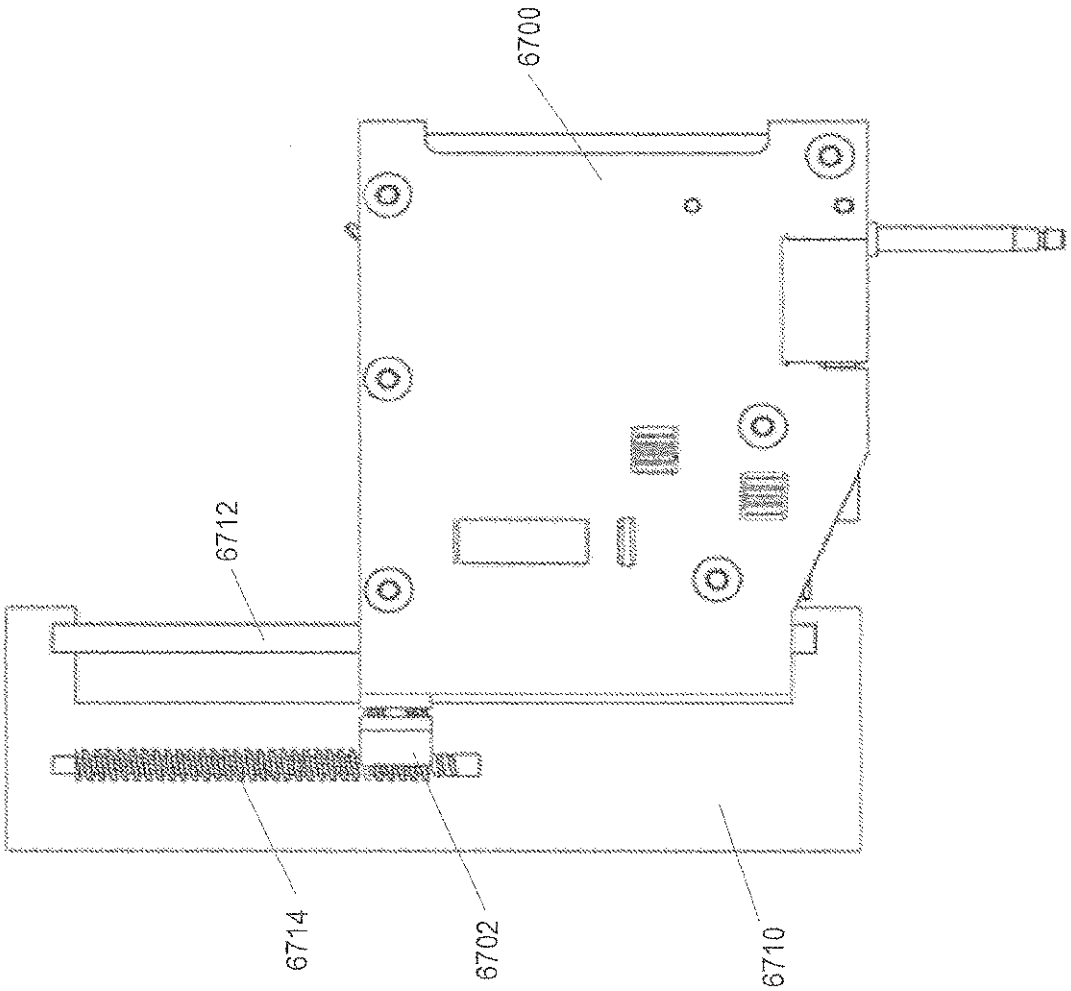


FIG. 67B

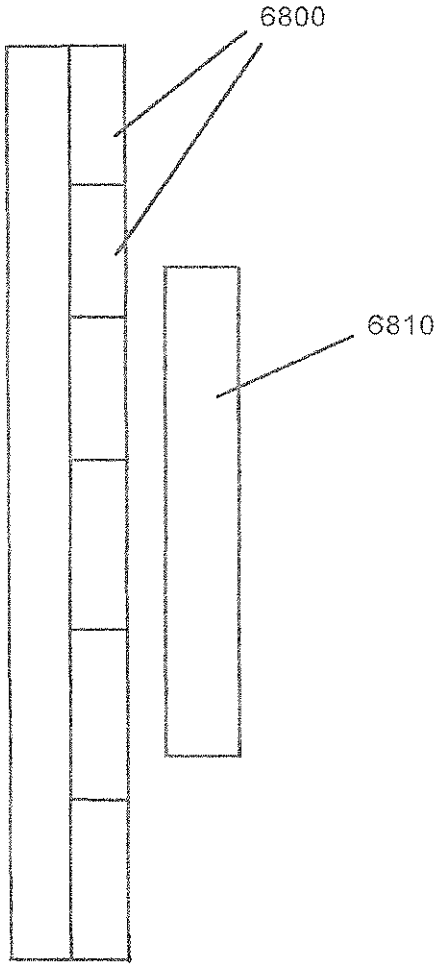


FIG. 68A

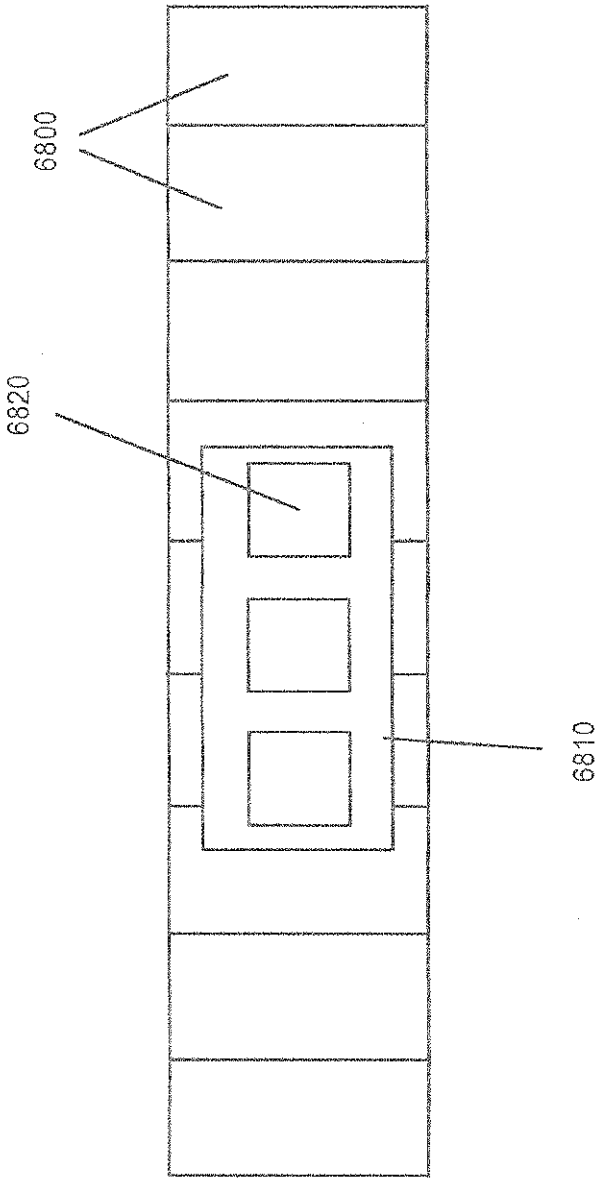


FIG. 68B

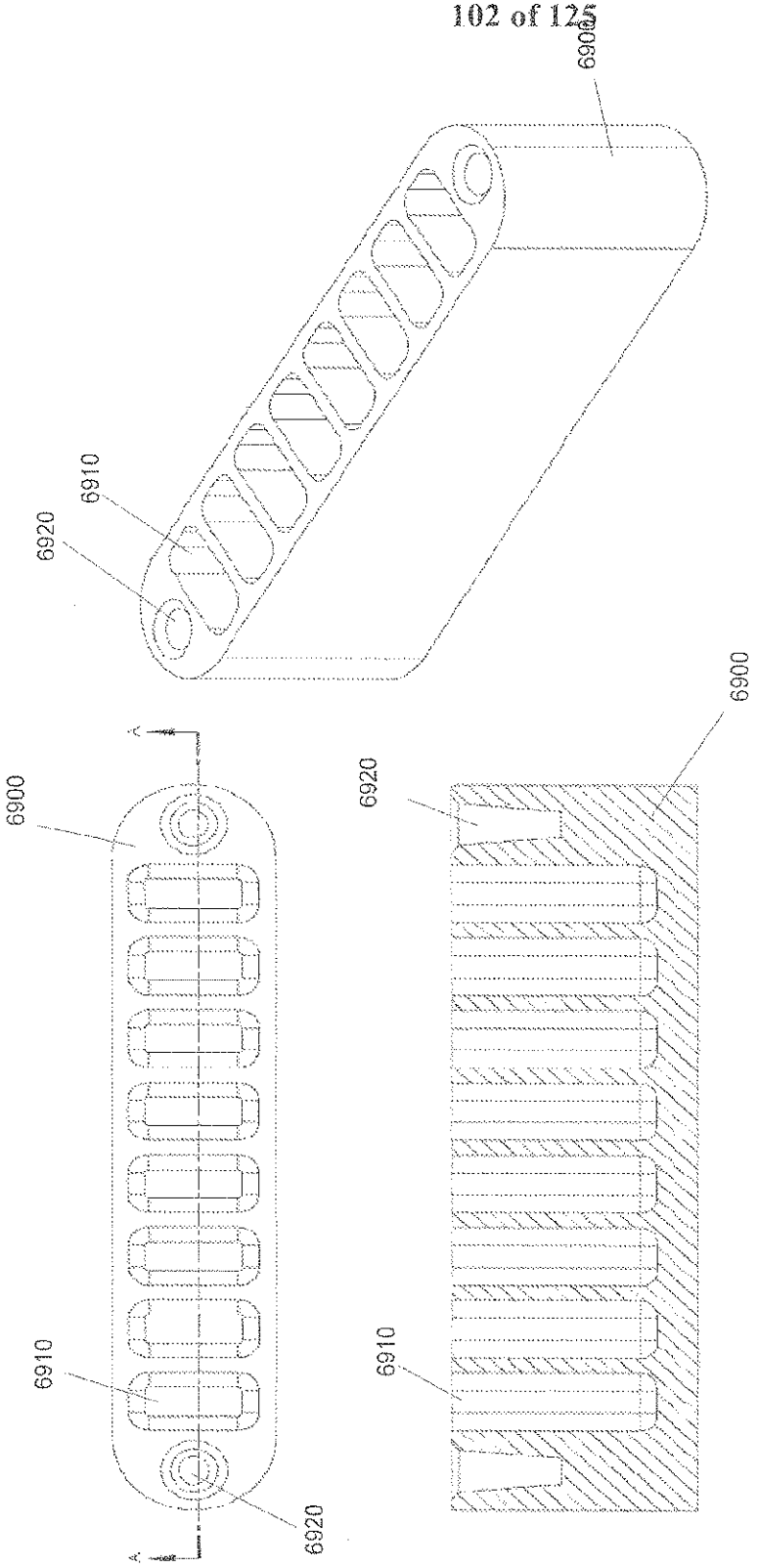


FIG. 69

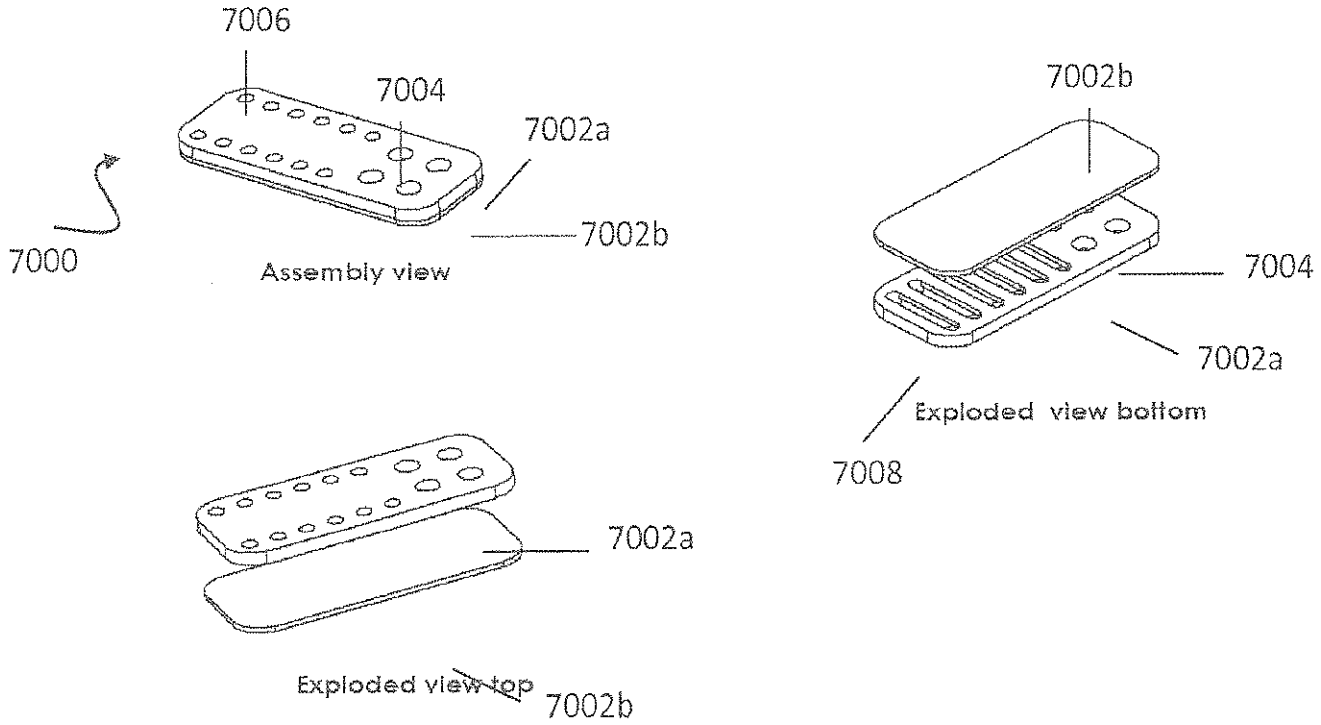
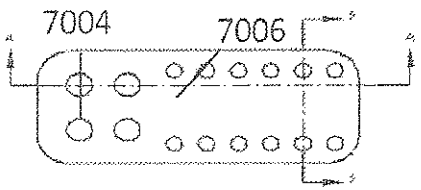
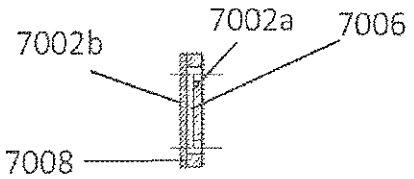

7006
7004
7002a
7000
7002b
Assembly view
7002b
7004
7002a
Exploded view bottom
7008
7002a
Exploded view top
7002b

FIG. 70A



Assembly Top view



Assembly Cross Section B-B

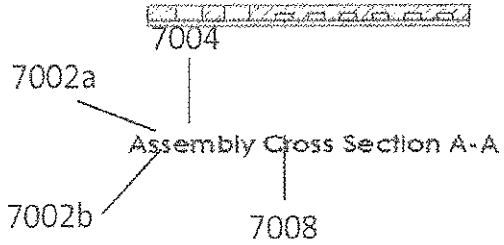


FIG. 70B

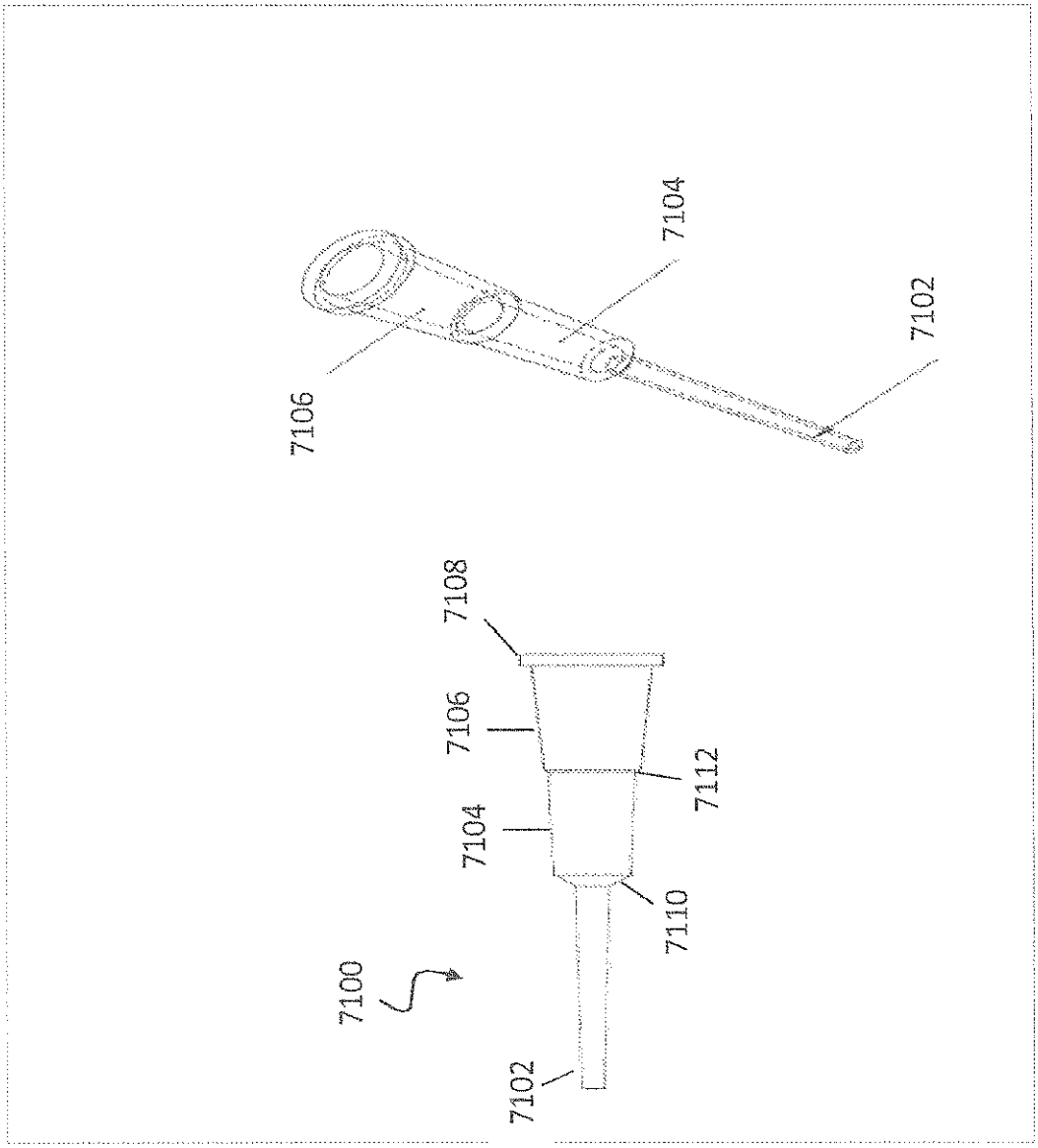


FIG. 71

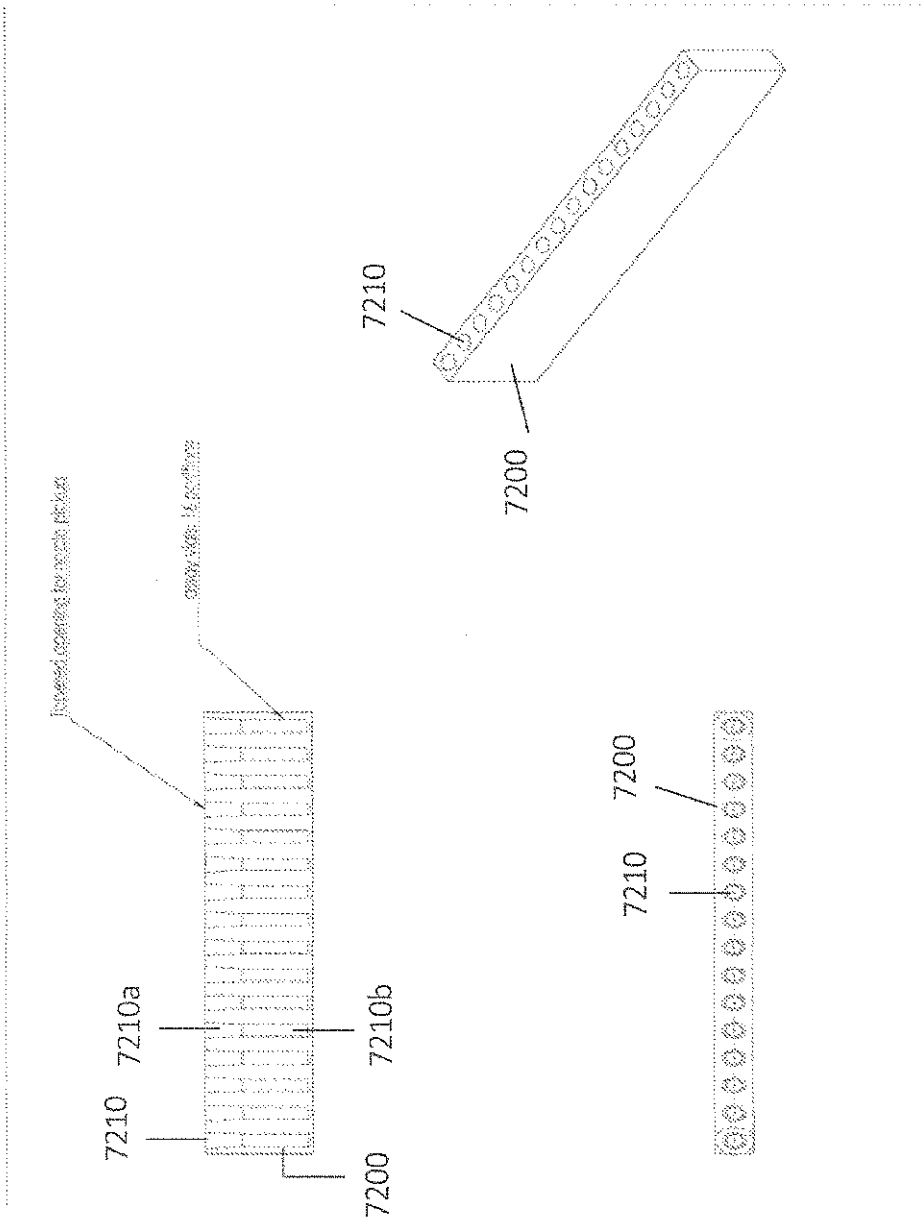


FIG. 72

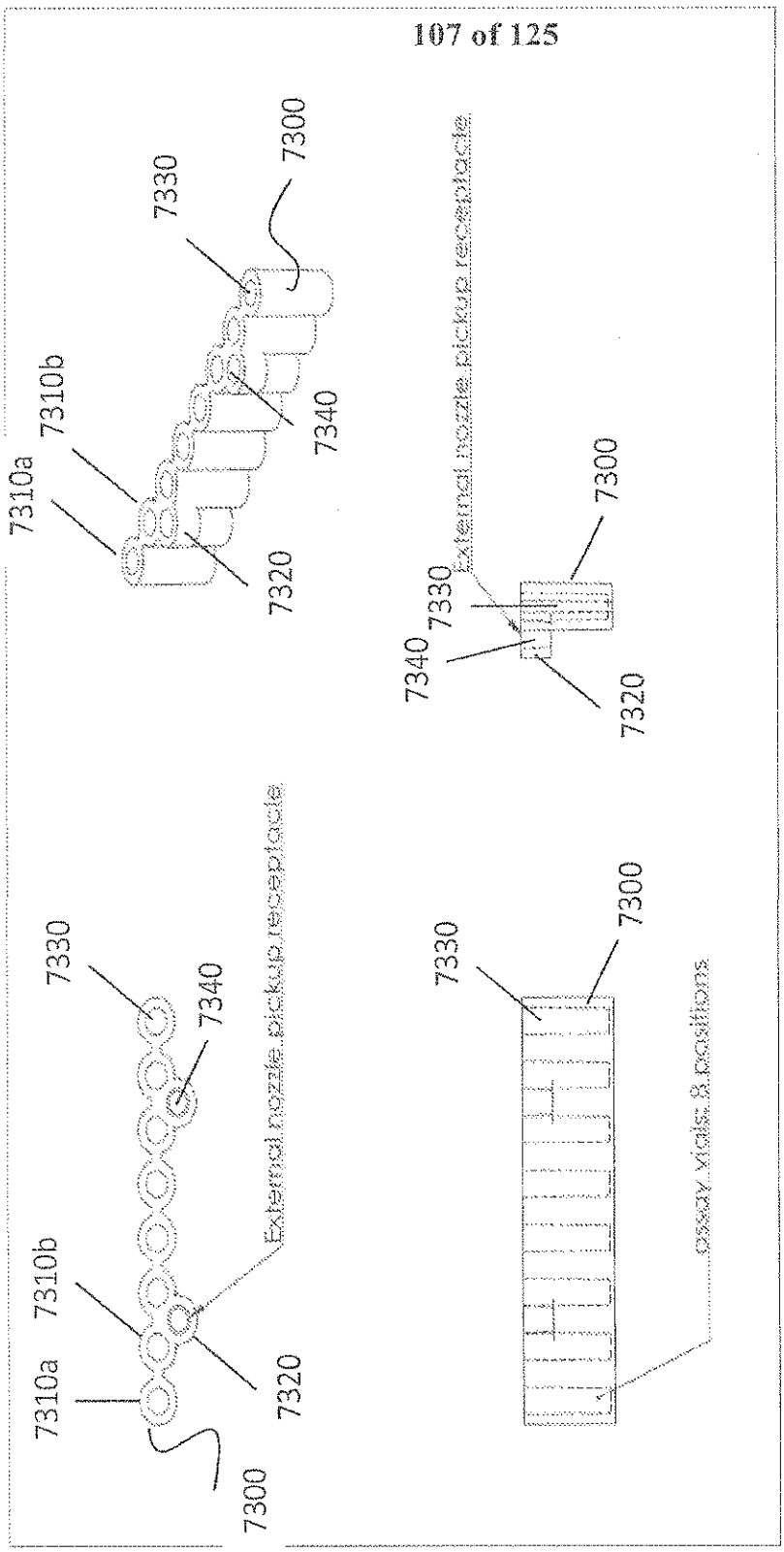

7310a
7310b
7330
7300
7340
7320
External nozzle pickup receptacle
assay vials & positions

FIG. 73

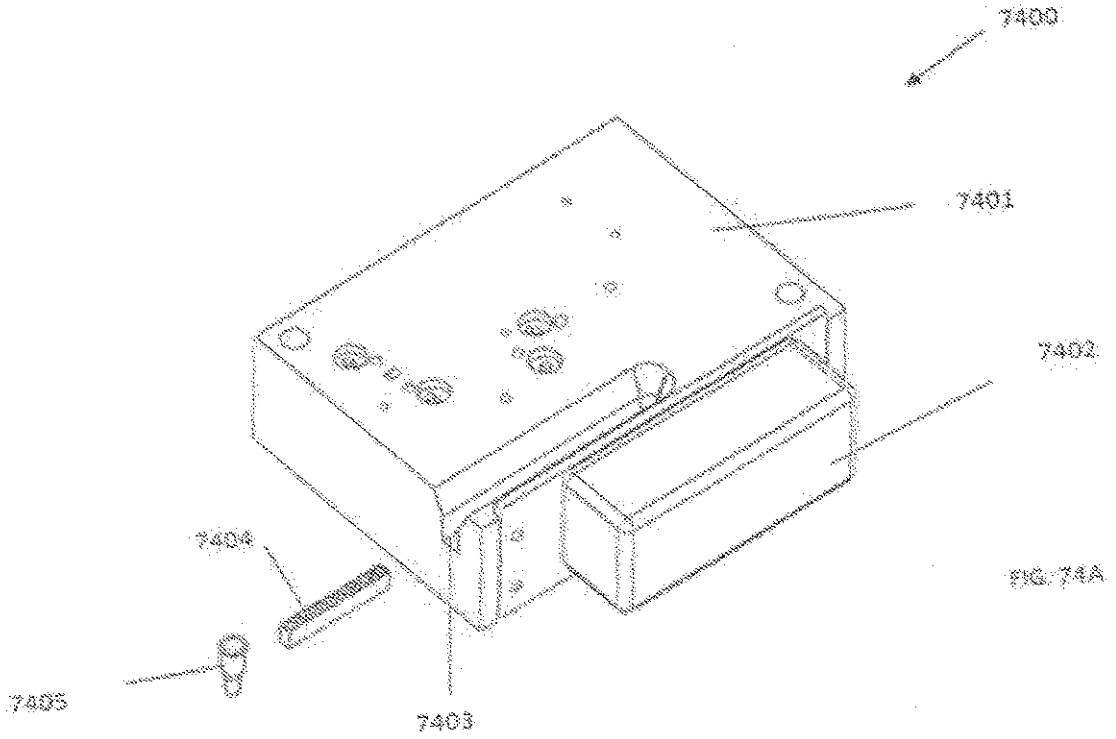


FIG. 74A

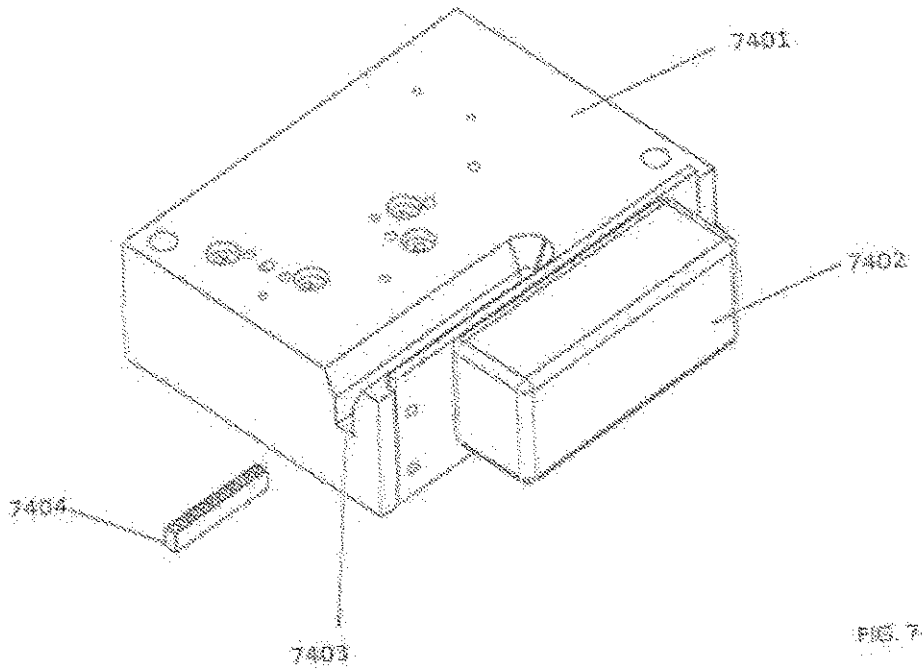


FIG. 74B

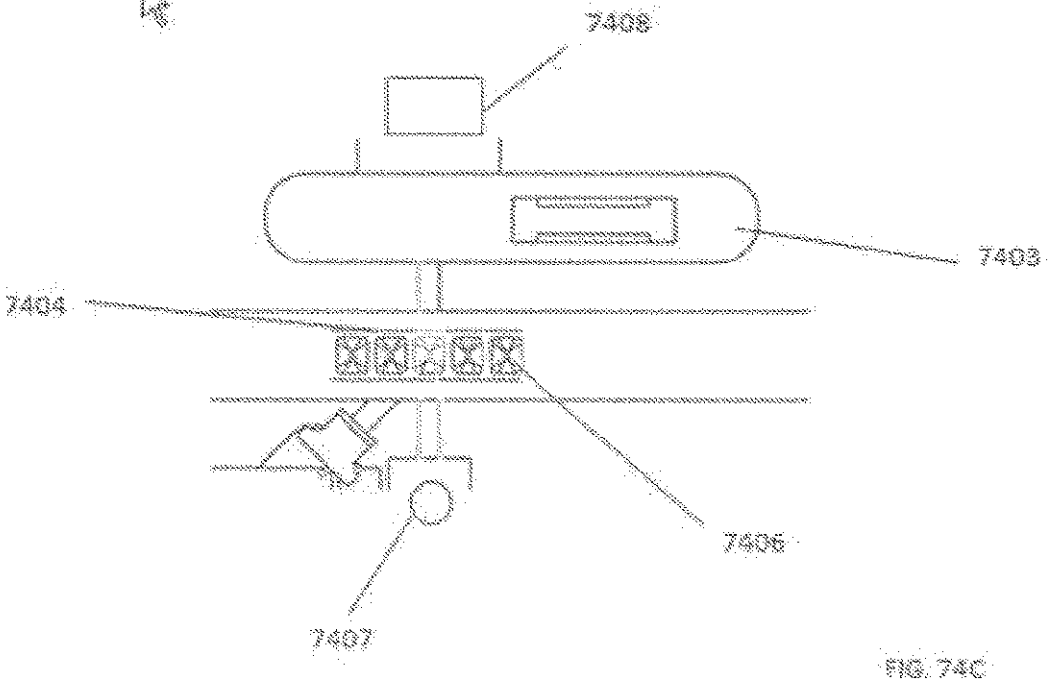


FIG. 74C

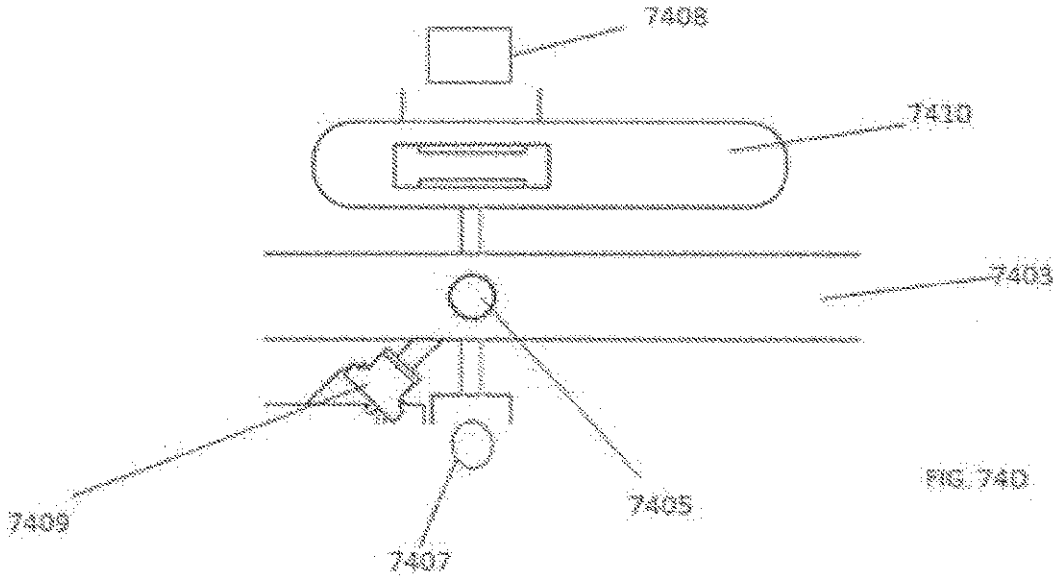


FIG. 74D

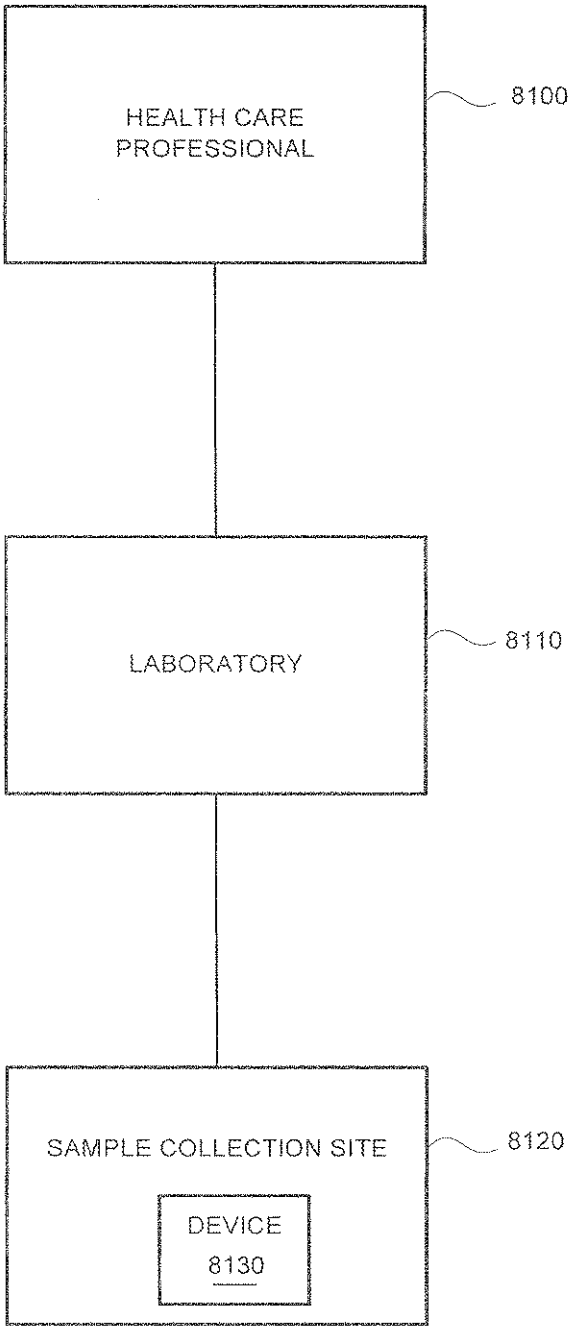

HEALTH CARE PROFESSIONAL
8100
LABORATORY
8110
SAMPLE COLLECTION SITE
DEVICE 8130
8120

FIG. 75A

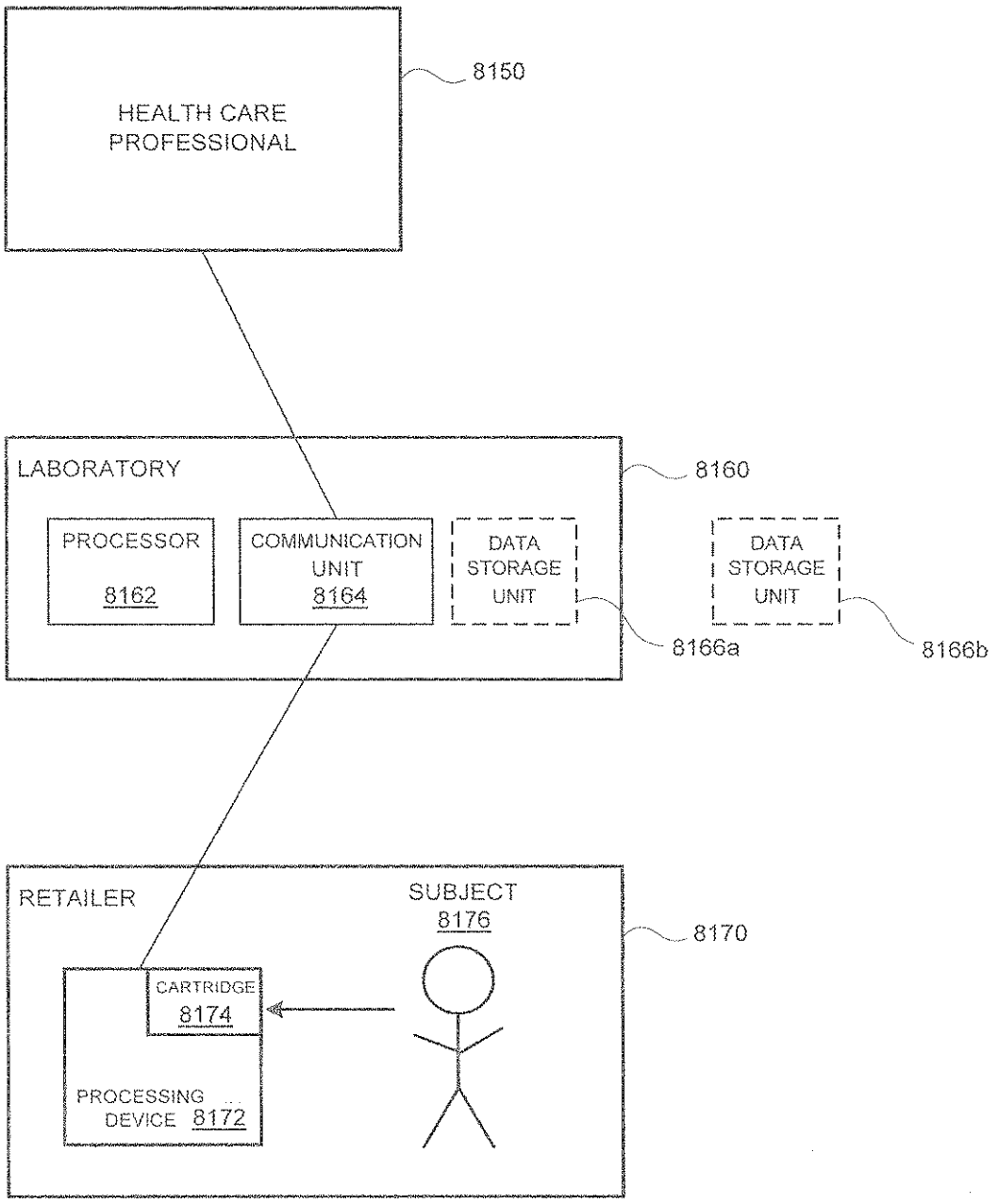

HEALTH CARE PROFESSIONAL
8150
LABORATORY
8160
PROCESSOR
8162
COMMUNICATION UNIT
8164
DATA STORAGE UNIT
8166a
DATA STORAGE UNIT
8166b
RETAILER
SUBJECT
8176
8170
CARTRIDGE
8174
PROCESSING DEVICE
8172

FIG. 75B

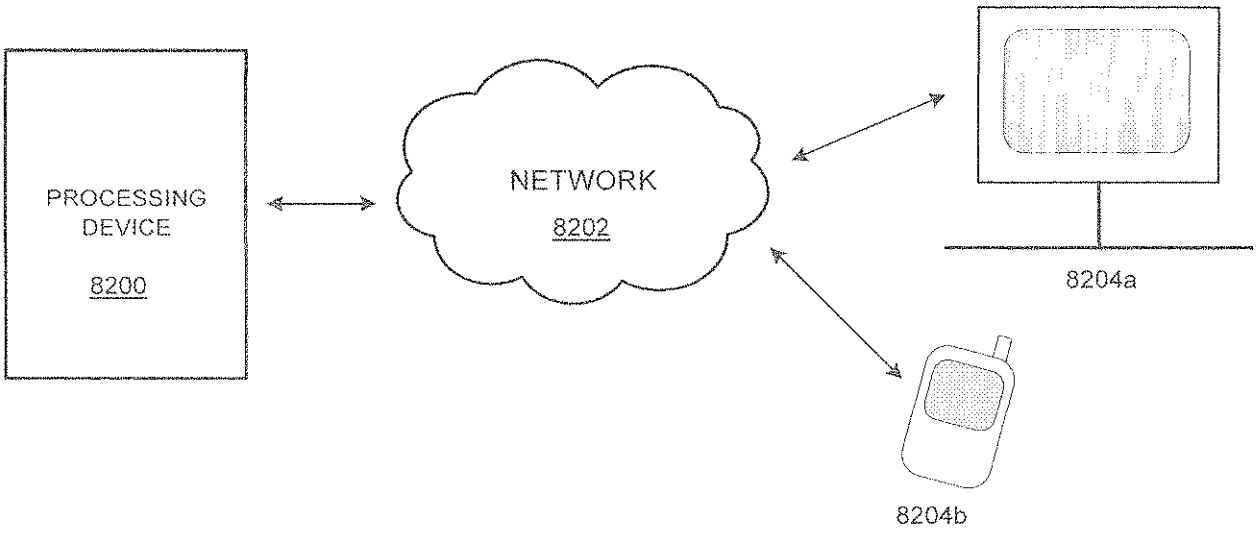


FIG. 76

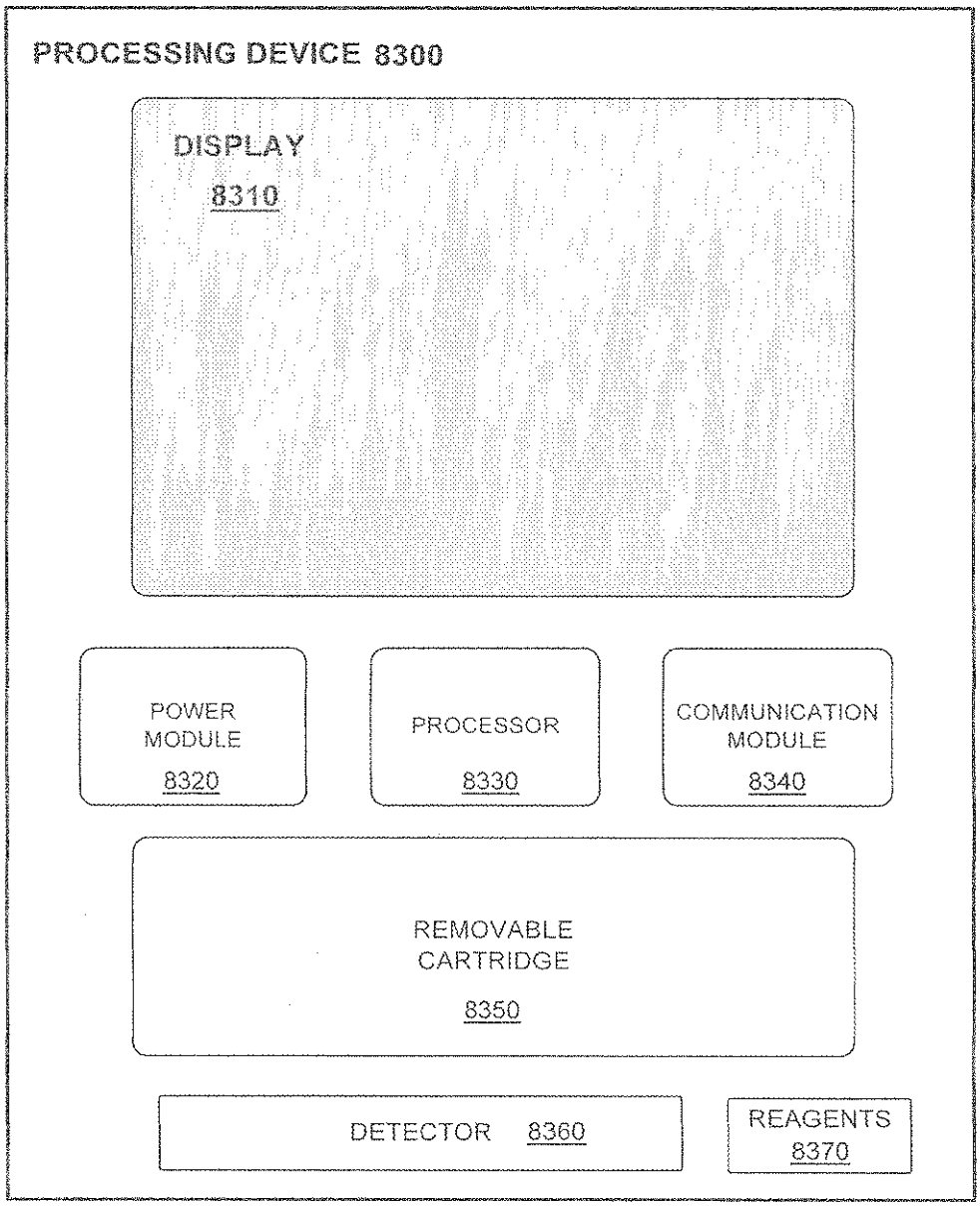

PROCESSING DEVICE 8300
DISPLAY
8310
POWER MODULE
8320
PROCESSOR
8330
COMMUNICATION MODULE
8340
REMOVABLE CARTRIDGE
8350
DETECTOR 8360
REAGENTS
8370

FIG. 77A

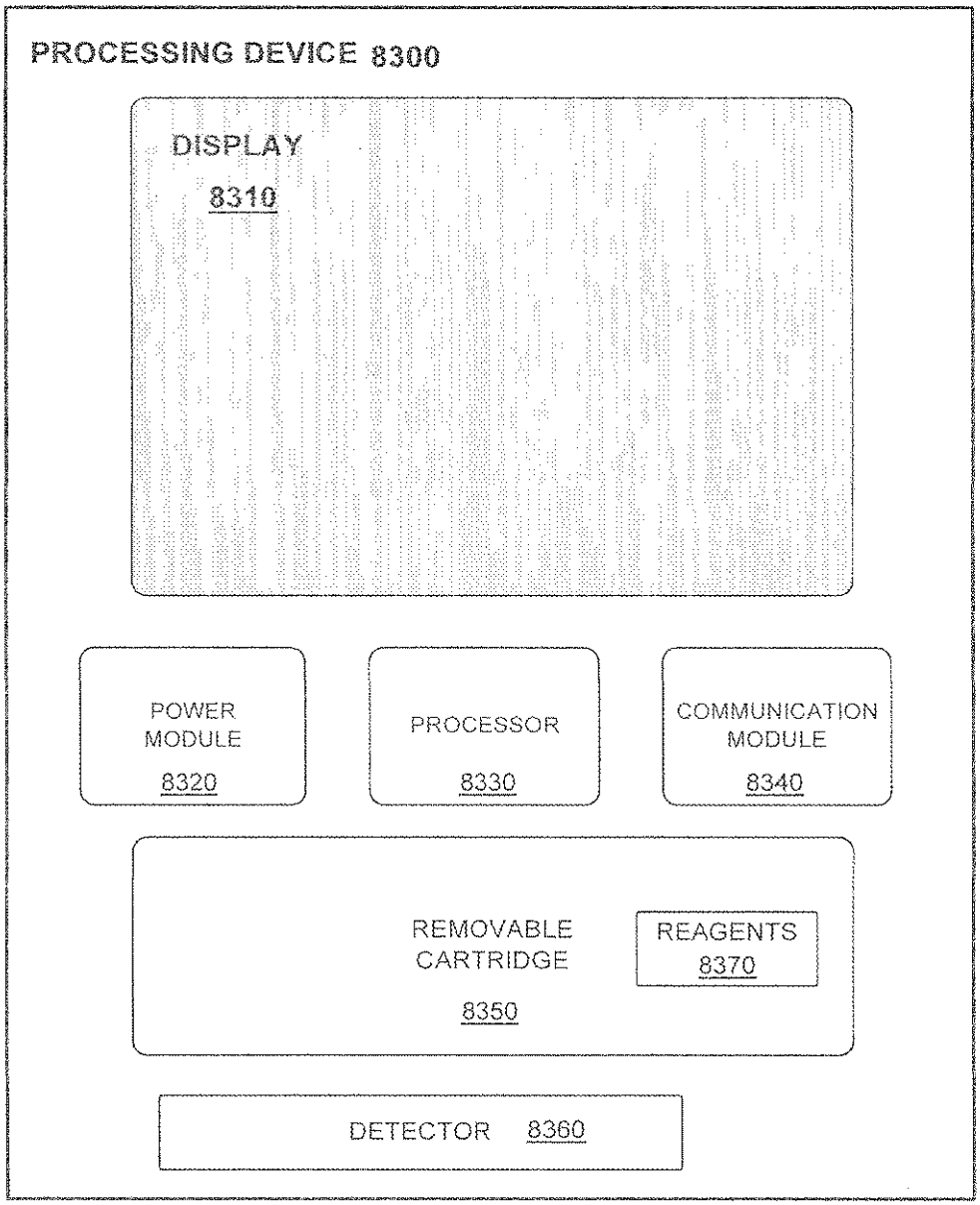

PROCESSING DEVICE 8300
DISPLAY
8310
POWER MODULE
8320
PROCESSOR
8330
COMMUNICATION MODULE
8340
REMOVABLE CARTRIDGE
8350
REAGENTS
8370
DETECTOR 8360

FIG. 77B

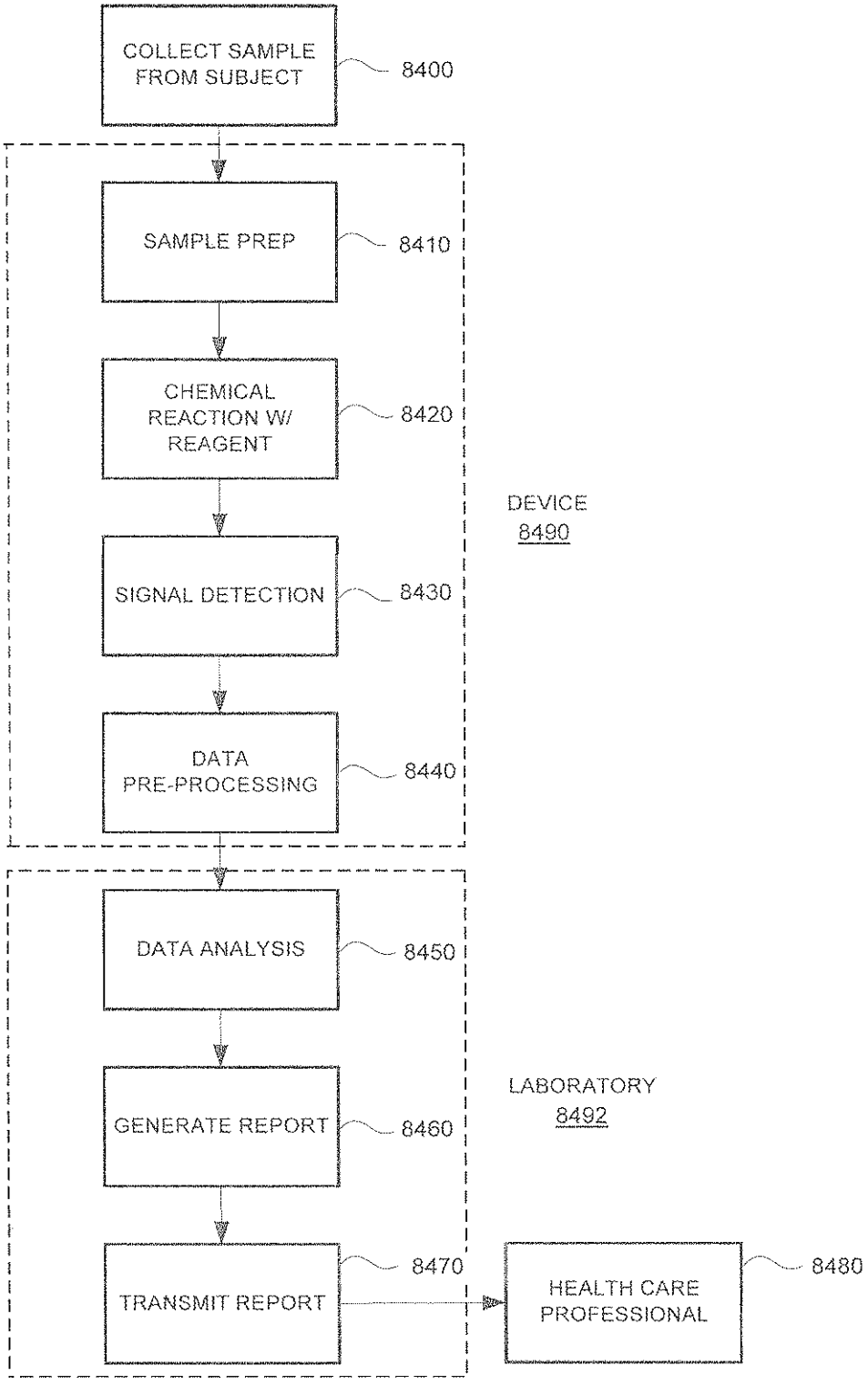

COLLECT SAMPLE FROM SUBJECT
8400
SAMPLE PREP
8410
CHEMICAL REACTION W/ REAGENT
8420
SIGNAL DETECTION
8430
DATA PRE-PROCESSING
8440
DEVICE
8490
DATA ANALYSIS
8450
GENERATE REPORT
8460
TRANSMIT REPORT
8470
LABORATORY
8492
HEALTH CARE PROFESSIONAL
8480

FIG. 78


PAYER
8500
LAB BENEFITS MANAGER
8510
SAMPLE COLLECTION SITE
8520

FIG. 79

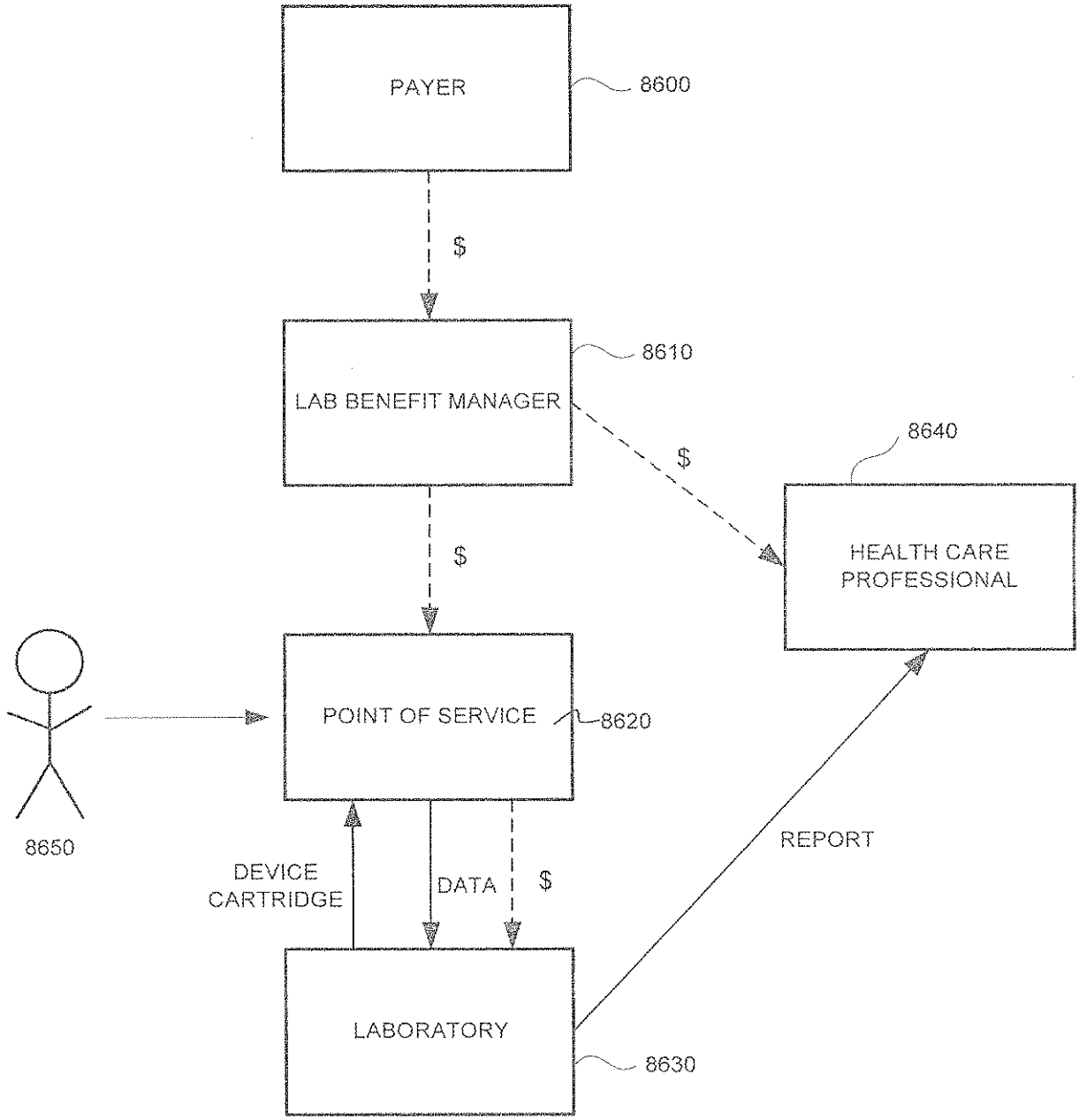

PAYER
8600
$
LAB BENEFIT MANAGER
8610
$
8640
HEALTH CARE PROFESSIONAL
$
POINT OF SERVICE
8620
8650
DEVICE CARTRIDGE
DATA
$
REPORT
LABORATORY
8630

FIG. 80

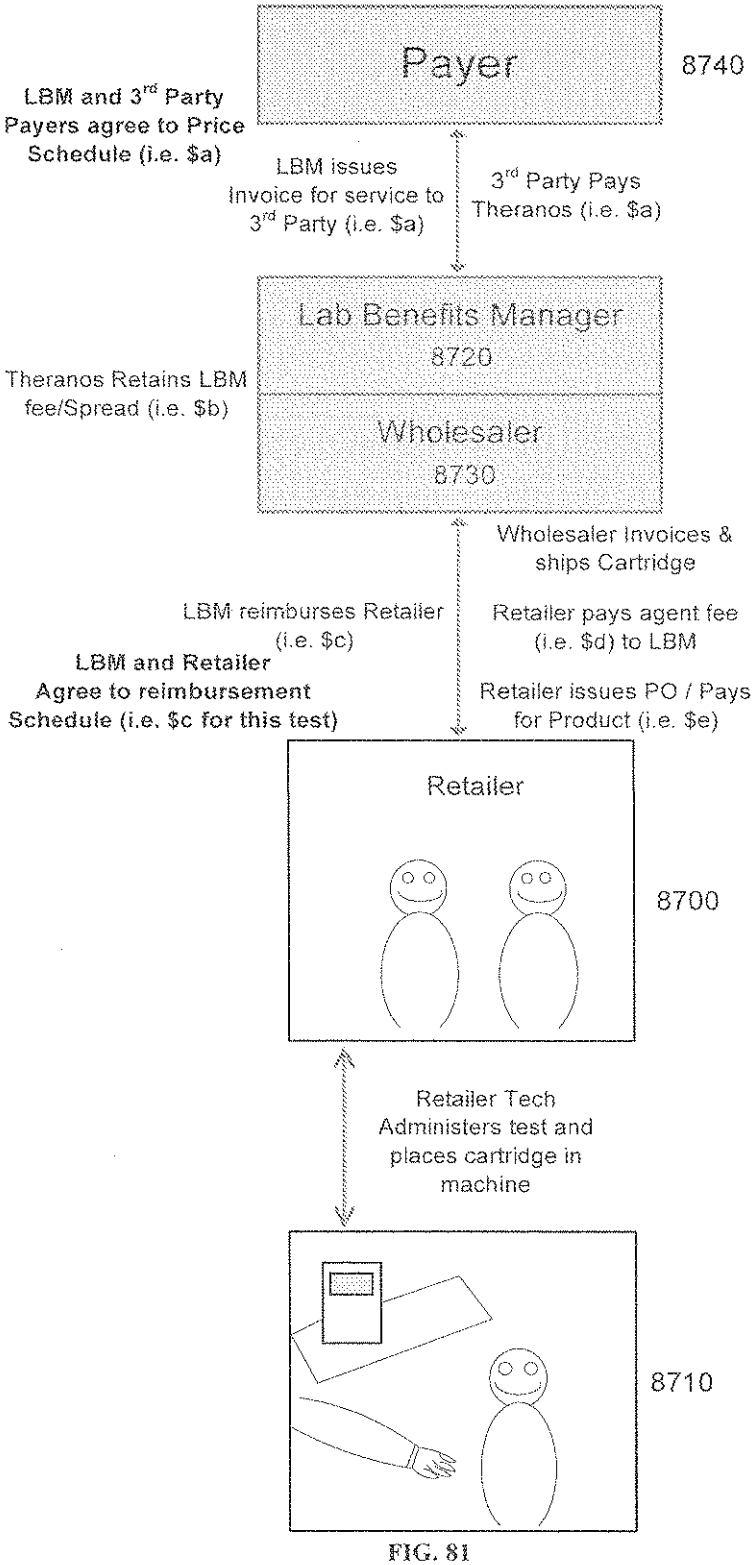

Payer
8740
LBM and 3rd Party Payers agree to Price Schedule (i.e. $a)
LBM issues Invoice for service to 3rd Party (i.e. $a)
3rd Party Pays Theranos (i.e. $a)
Lab Benefits Manager
8720
Theranos Retains LBM fee/Spread (i.e. $b)
Wholesaler
8730
Wholesaler Invoices & ships Cartridge
LBM reimburses Retailer (i.e. $c)
Retailer pays agent fee (i.e. $d) to LBM
LBM and Retailer Agree to reimbursement Schedule (i.e. $c for this test)
Retailer issues PO / Pays for Product (i.e. $e)
Retailer
8700
Retailer Tech Administers test and places cartridge in machine
8710

FIG. 81

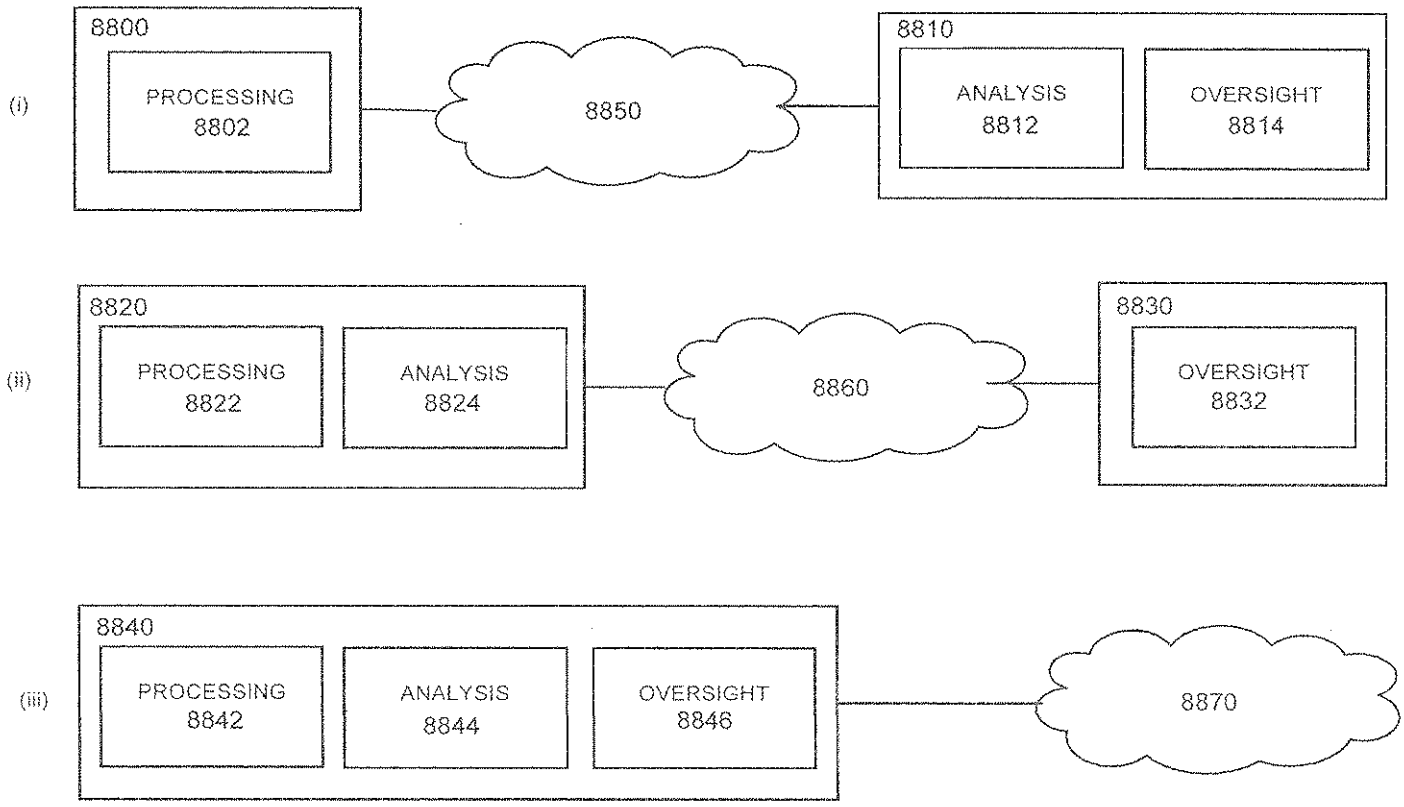

(i)
8800
PROCESSING
8802
8850
8810
ANALYSIS
8812
OVERSIGHT
8814
(ii)
8820
PROCESSING
8822
ANALYSIS
8824
8860
8830
OVERSIGHT
8832
(iii)
8840
PROCESSING
8842
ANALYSIS
8844
OVERSIGHT
8846
8870

FIG. 82

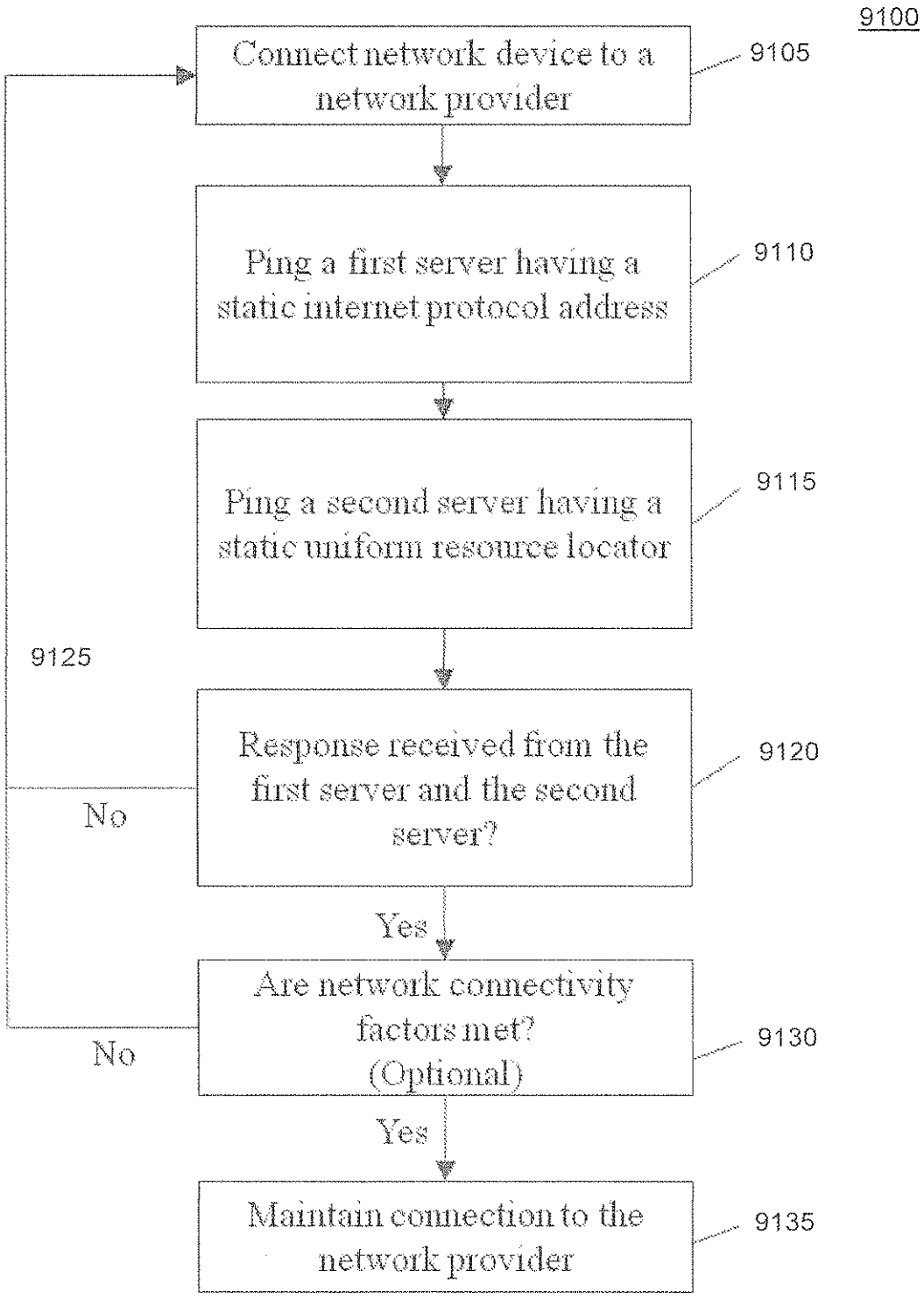

9100
Connect network device to a network provider
9105
Ping a first server having a static internet protocol address
9110
Ping a second server having a static uniform resource locator
9115
9125
Response received from the first server and the second server?
9120
No
Yes
Are network connectivity factors met? (Optional)
9130
No
Yes
Maintain connection to the network provider
9135

FIG. 83

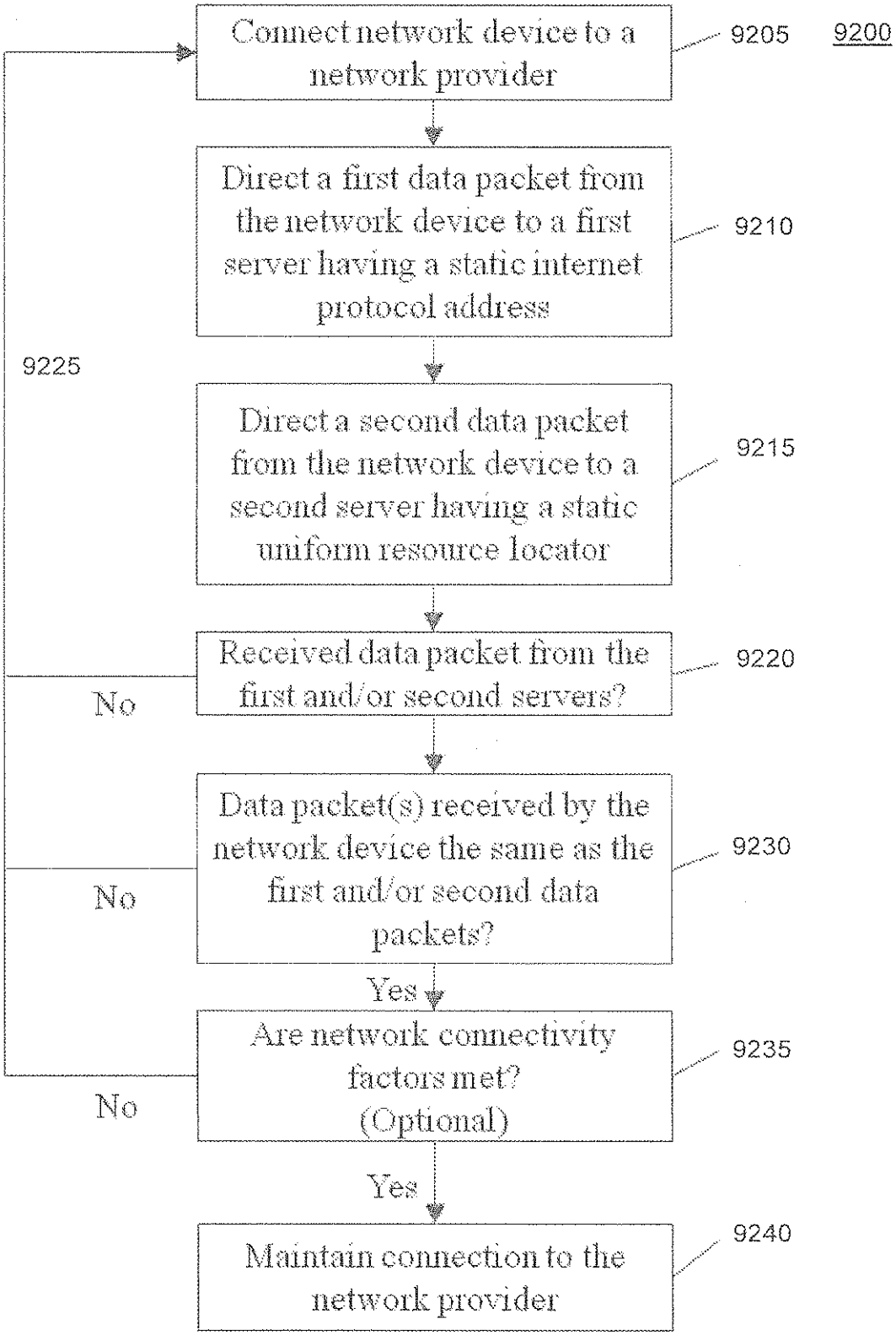

Connect network device to a network provider
9205
9200
Direct a first data packet from the network device to a first server having a static internet protocol address
9210
9225
Direct a second data packet from the network device to a second server having a static uniform resource locator
9215
Received data packet from the first and/or second servers?
9220
No
Data packet(s) received by the network device the same as the first and/or second data packets?
9230
No
Yes
Are network connectivity factors met? (Optional)
9235
No
Yes
Maintain connection to the network provider
9240

FIG. 84

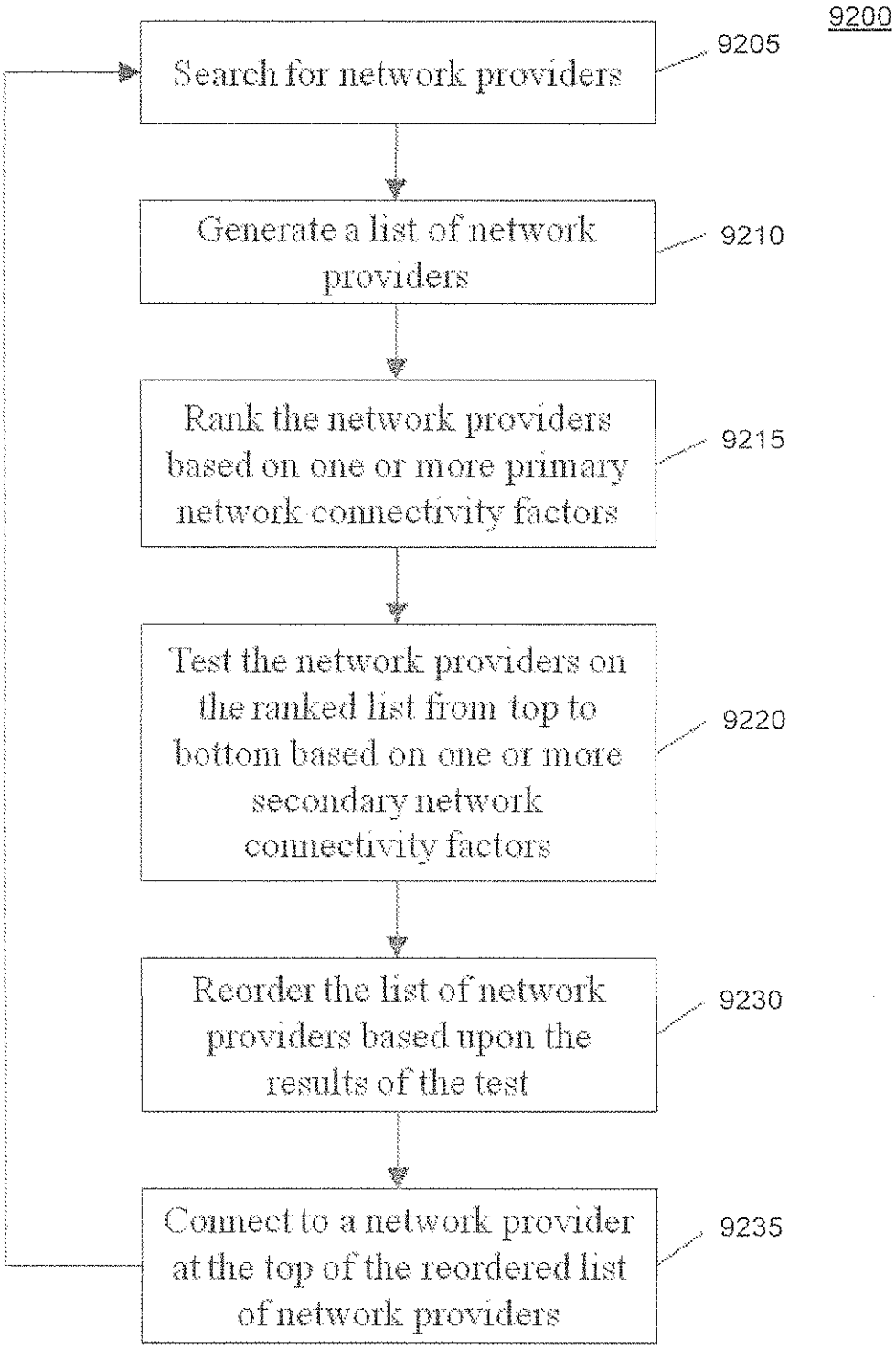

9200
Search for network providers
9205
Generate a list of network providers
9210
Rank the network providers based on one or more primary network connectivity factors
9215
Test the network providers on the ranked list from top to bottom based on one or more secondary network connectivity factors
9220
Reorder the list of network providers based upon the results of the test
9230
Connect to a network provider at the top of the reordered list of network providers
9235

FIG. 85

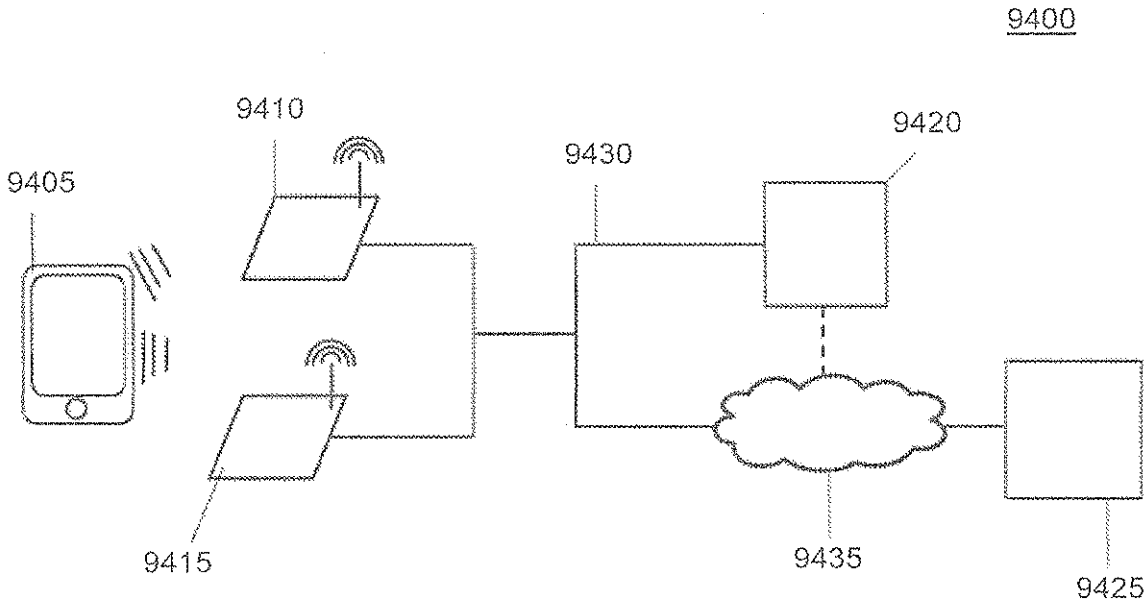


FIG. 86

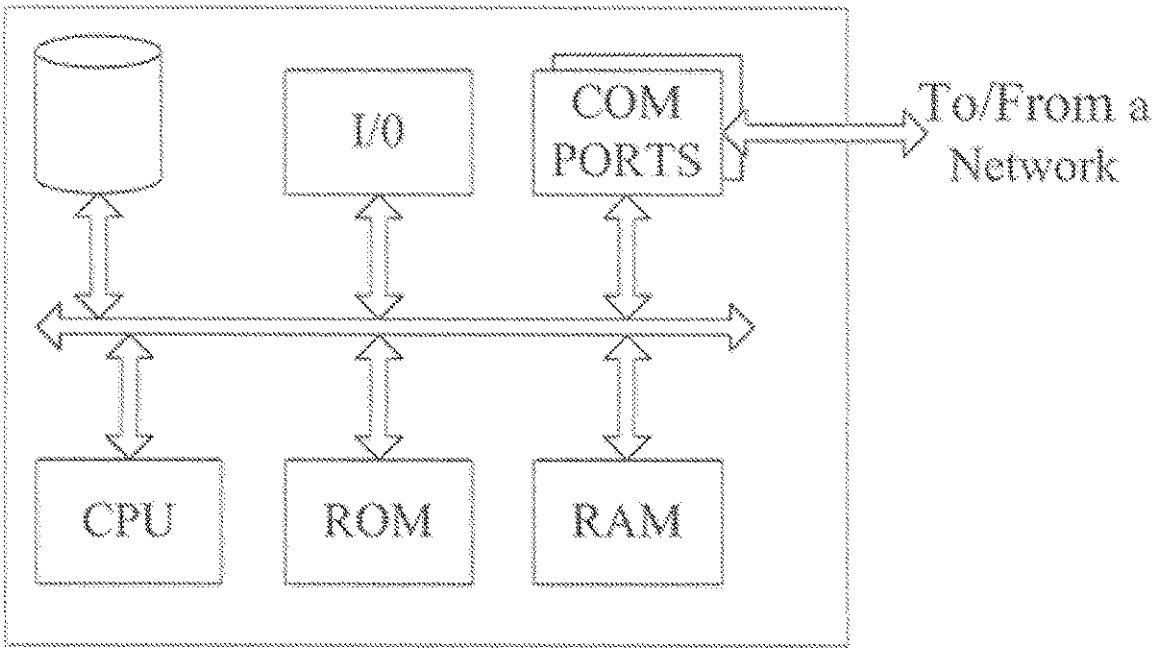


FIG. 87

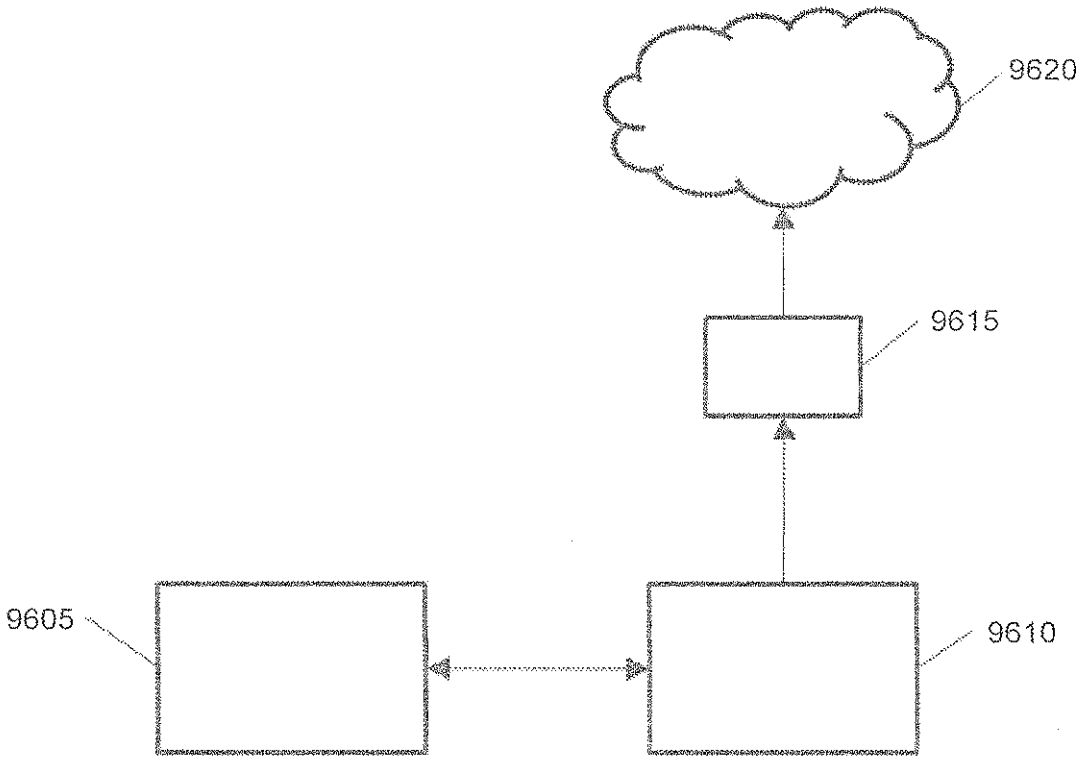


FIG. 88