

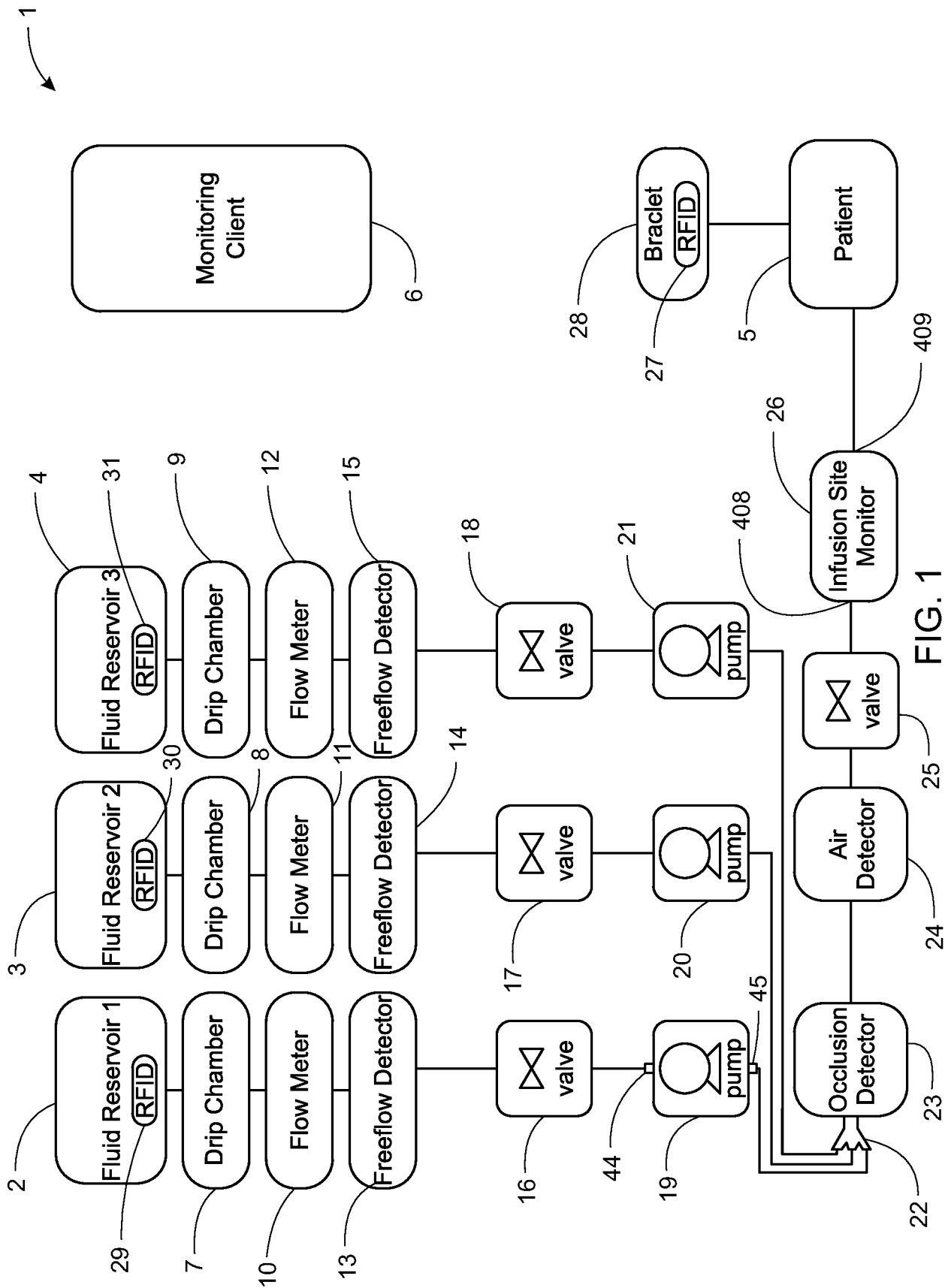


FIG. 1

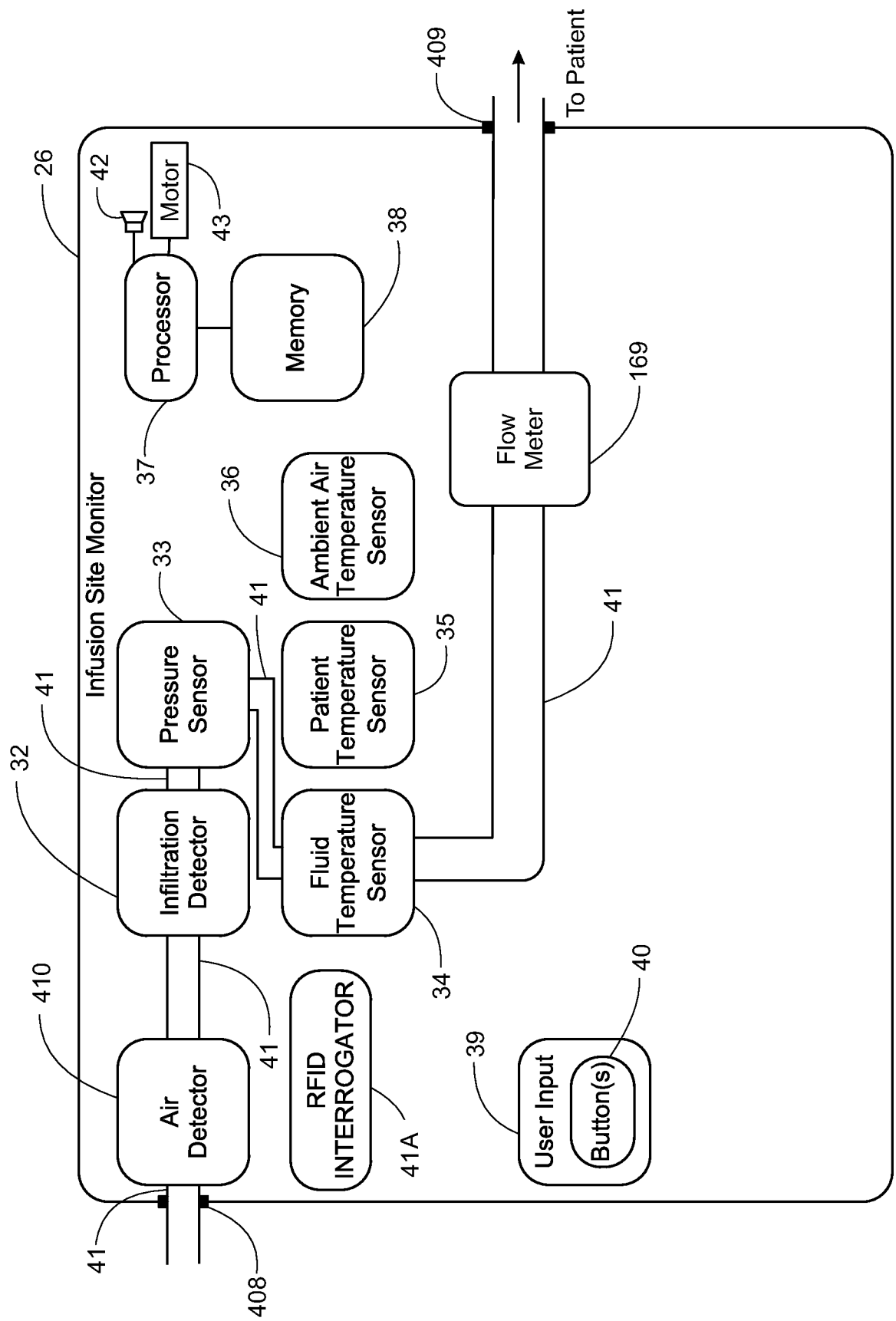


FIG. 2

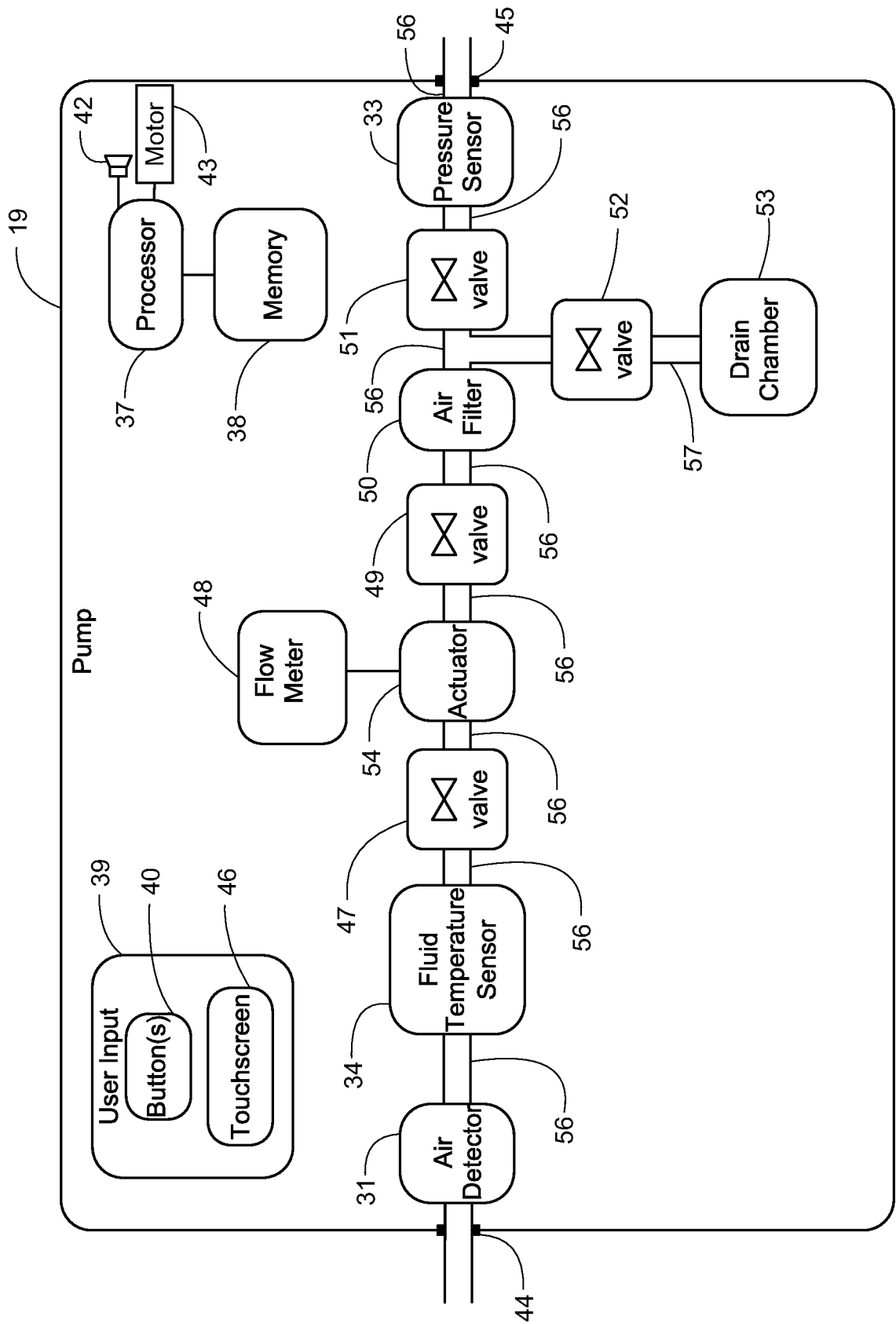


FIG. 3

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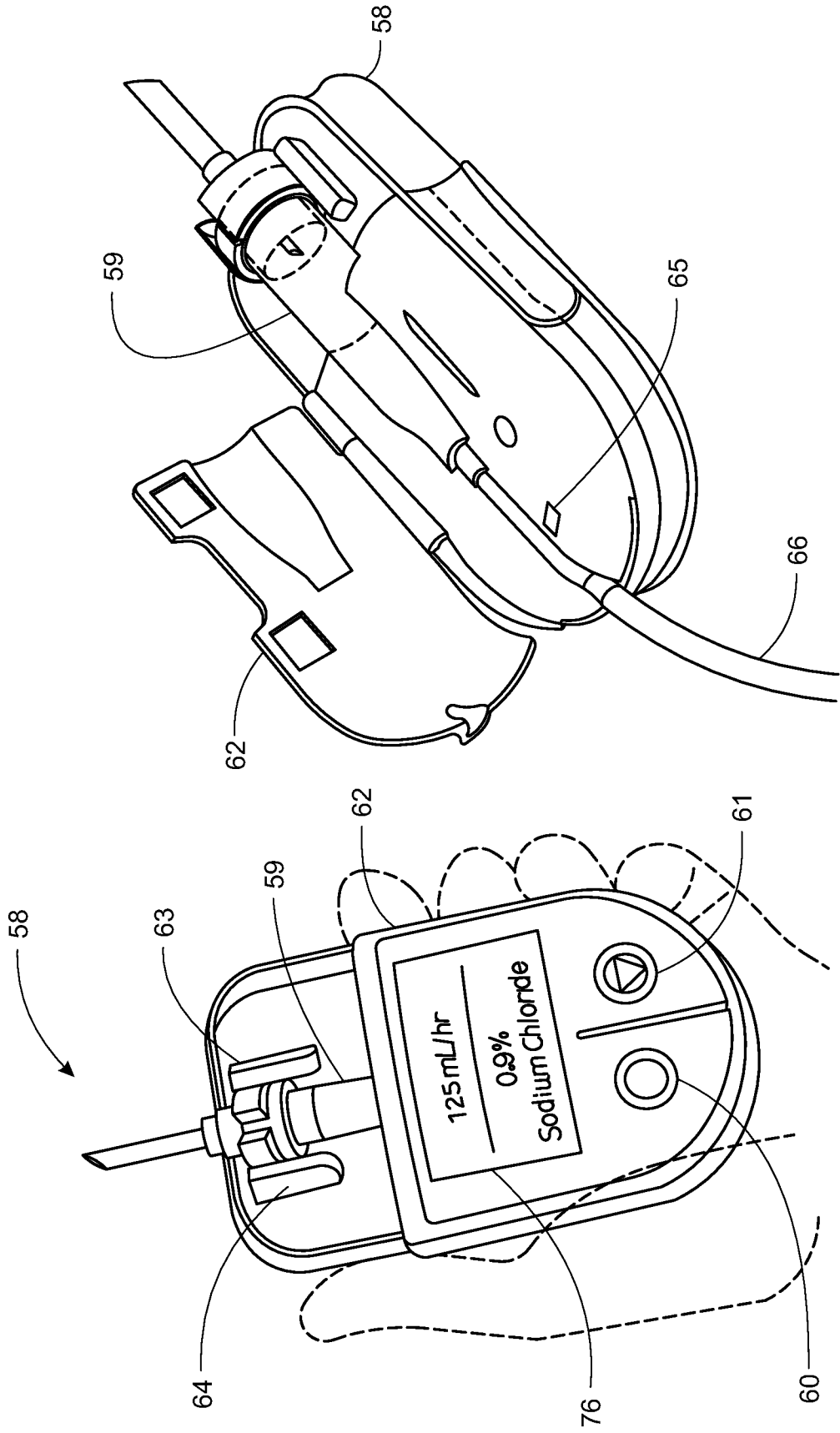
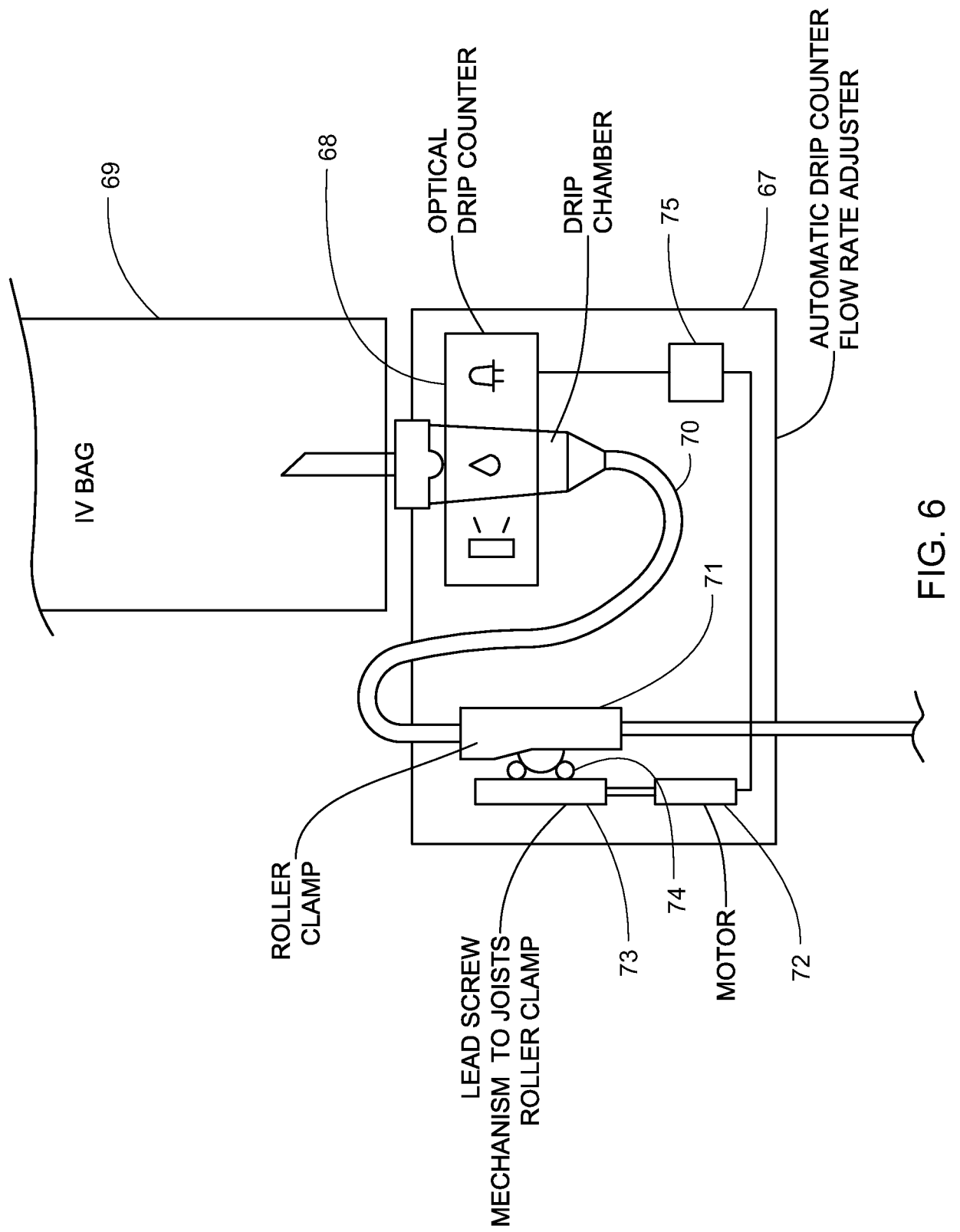


FIG. 5

FIG. 4

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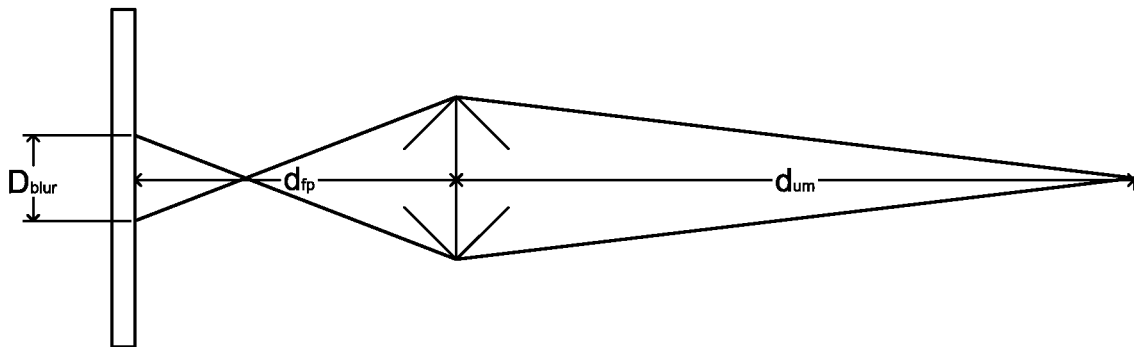


FIG. 7

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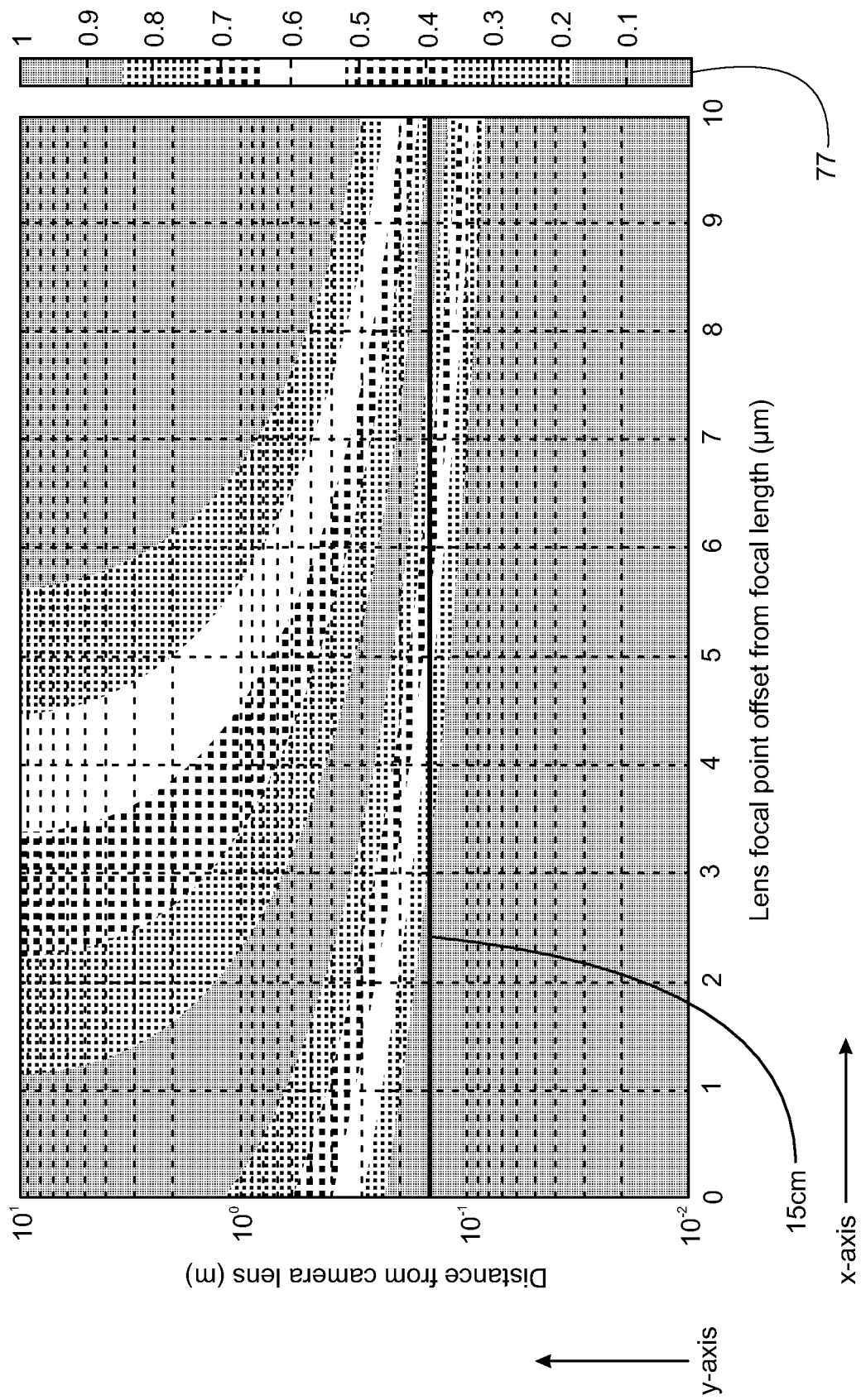
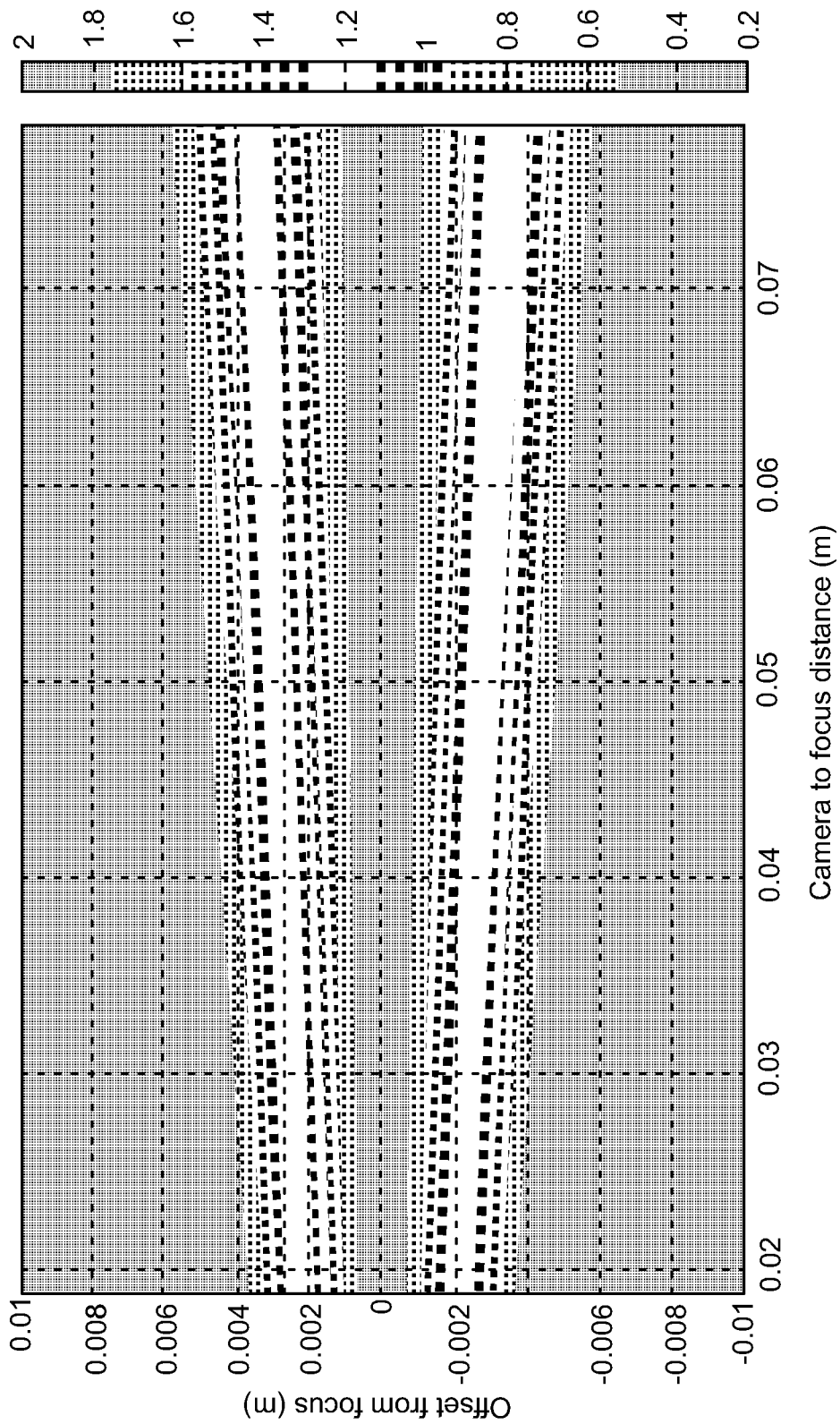


FIG. 8

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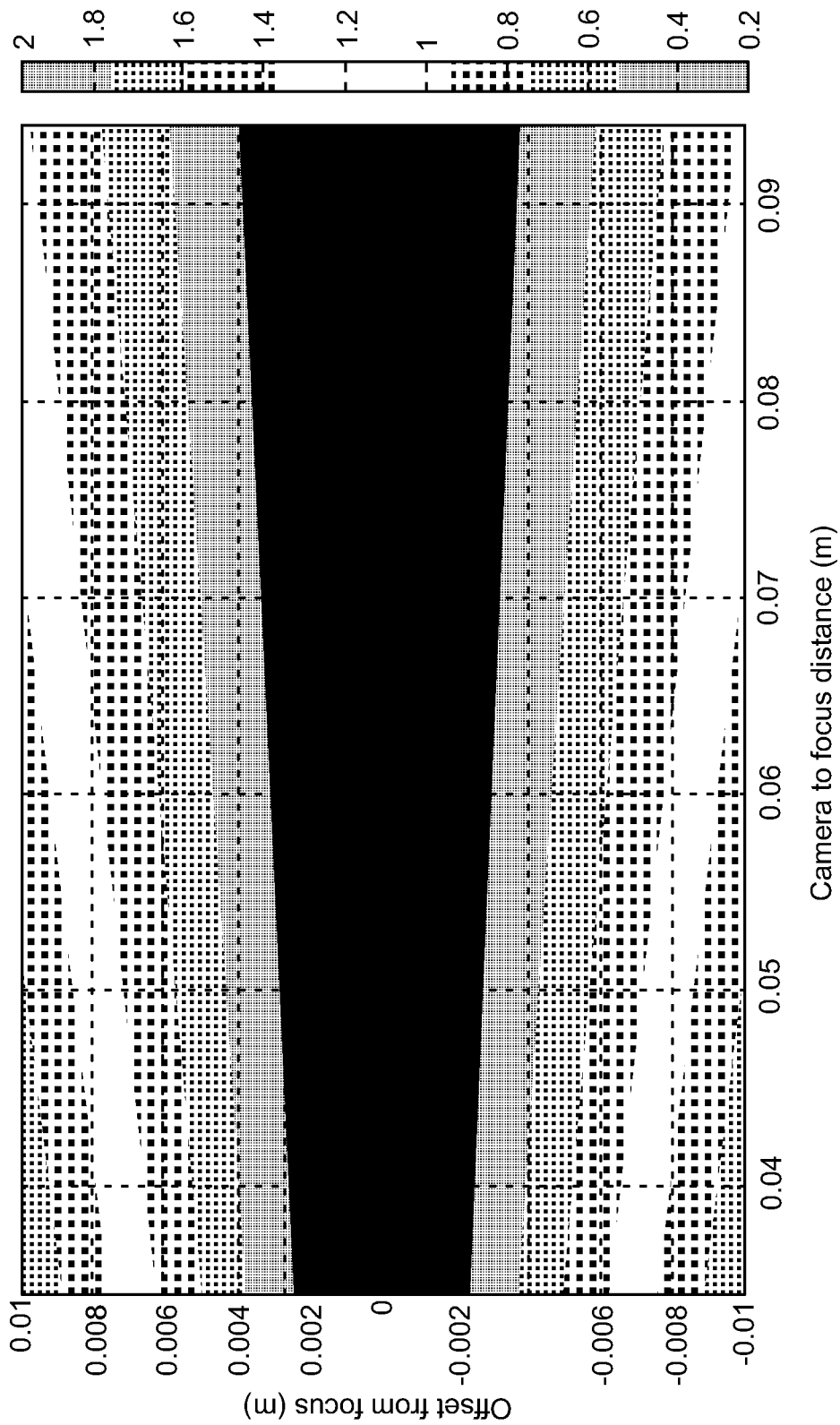


Blur circle divided by pixel size for a 20mm focal length lens

FIG. 9

+

+



Blur circle divided by pixel size for a 40mm focal length lens

FIG. 10

+

Lens focal length	Lens separation from the camera	Focus separation from the camera	Field of view	Depth of Field ($D_{\text{blur}}/D_{\text{pixel}}=1$)	Depth of Field ($D_{\text{blur}}/D_{\text{pixel}}=2$)
20mm	0mm	18.6mm	$\pm 9.7\text{mm}$	$\pm 2\text{mm}$	$\pm 4\text{mm}$
20mm	60mm	78.2mm	$\pm 12.3\text{mm}$	$\pm 3\text{mm}$	$\pm 6\text{mm}$
40mm	0mm	34.8mm	$\pm 18.2\text{mm}$	$\pm 5\text{mm}$	$\geq 10\text{mm}$
40mm	60mm	93.5mm	$\pm 22.6\text{mm}$	$\pm 10\text{mm}$	$\geq 10\text{mm}$
60mm	0mm	48.9mm	$\pm 25.6\text{mm}$	$\geq 10\text{mm}$	$\geq 10\text{mm}$
60mm	60mm	106.4mm	$\pm 31.4\text{mm}$	$\geq 10\text{mm}$	$\geq 10\text{mm}$

FIG. 11

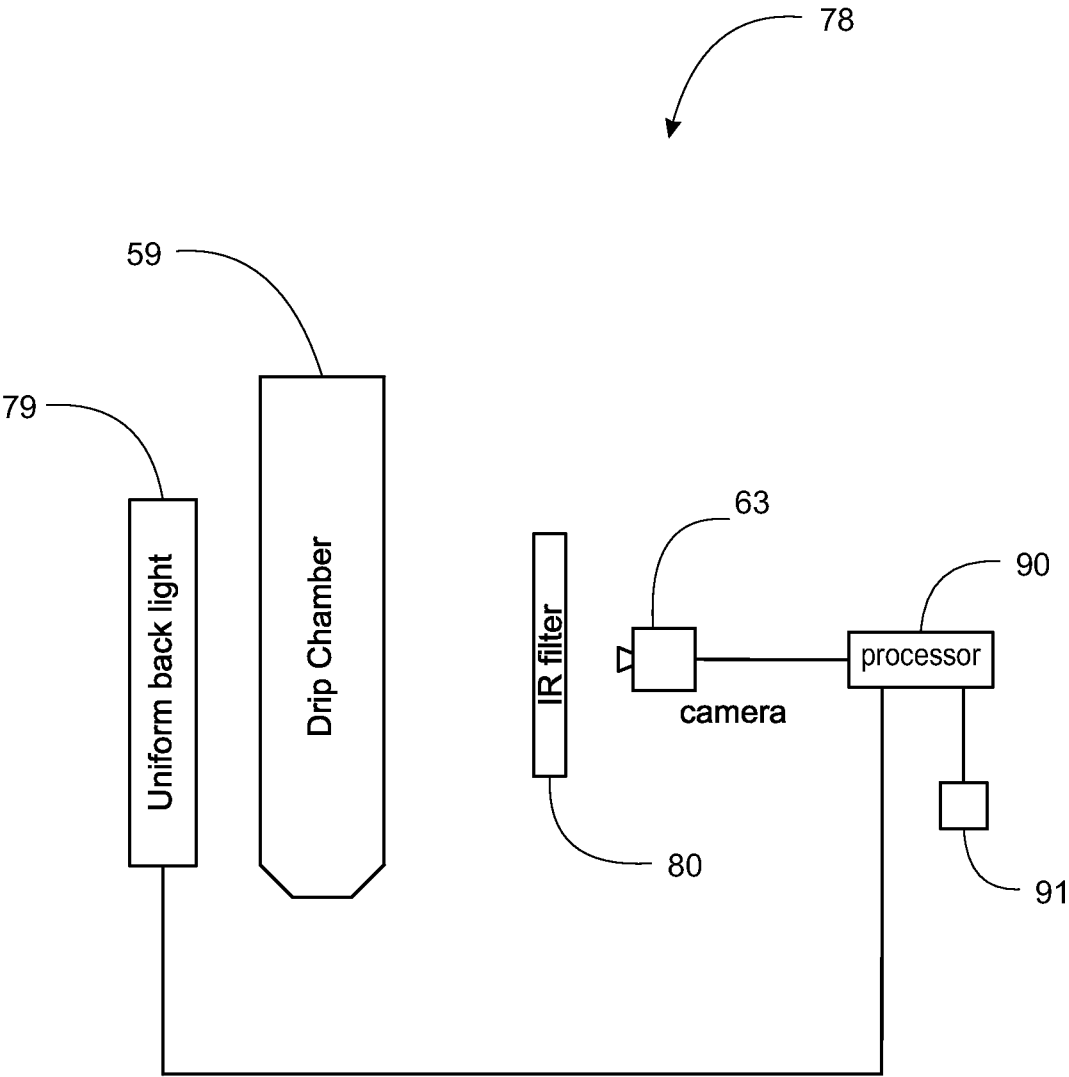


FIG. 12

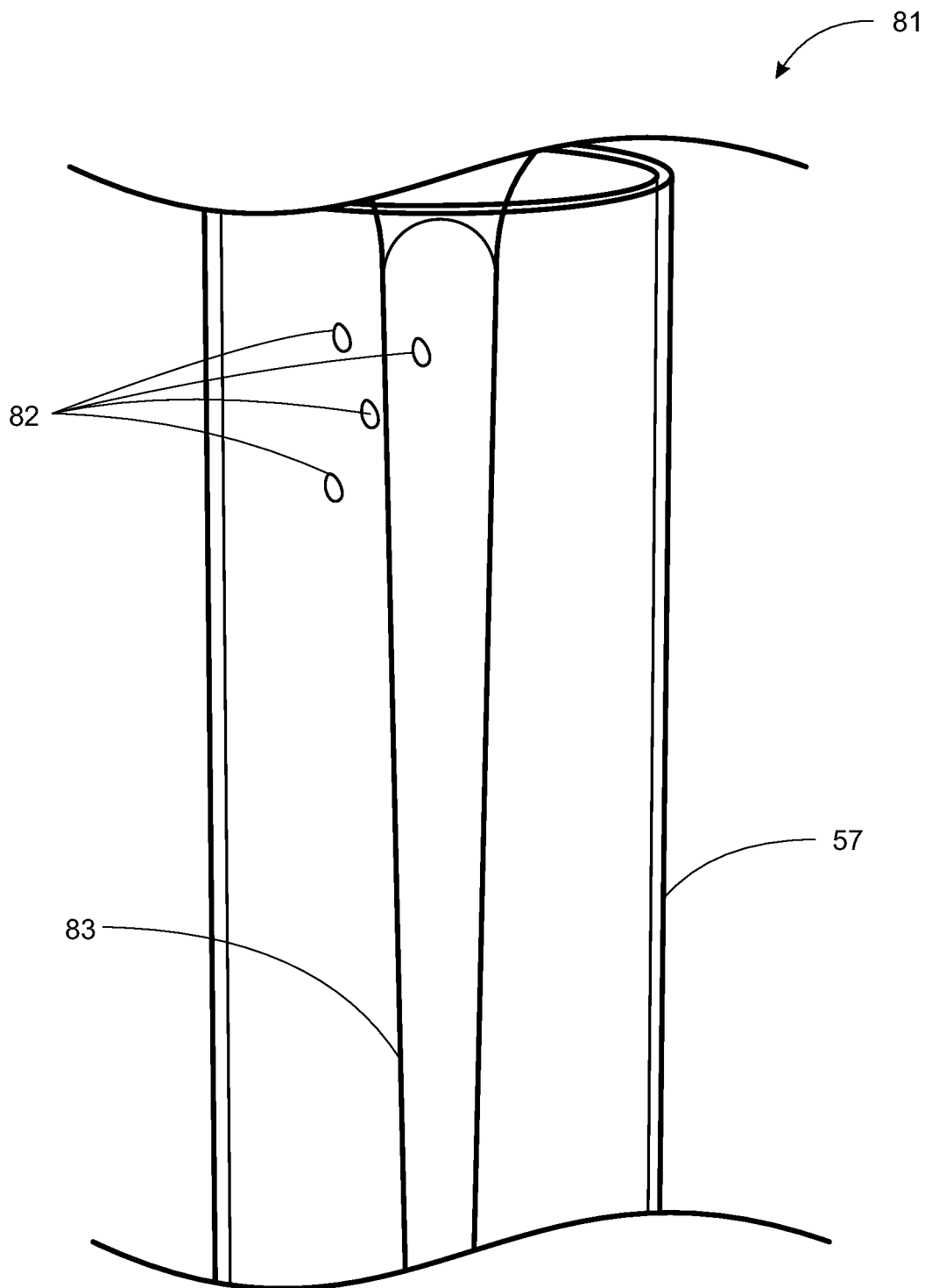


FIG. 13

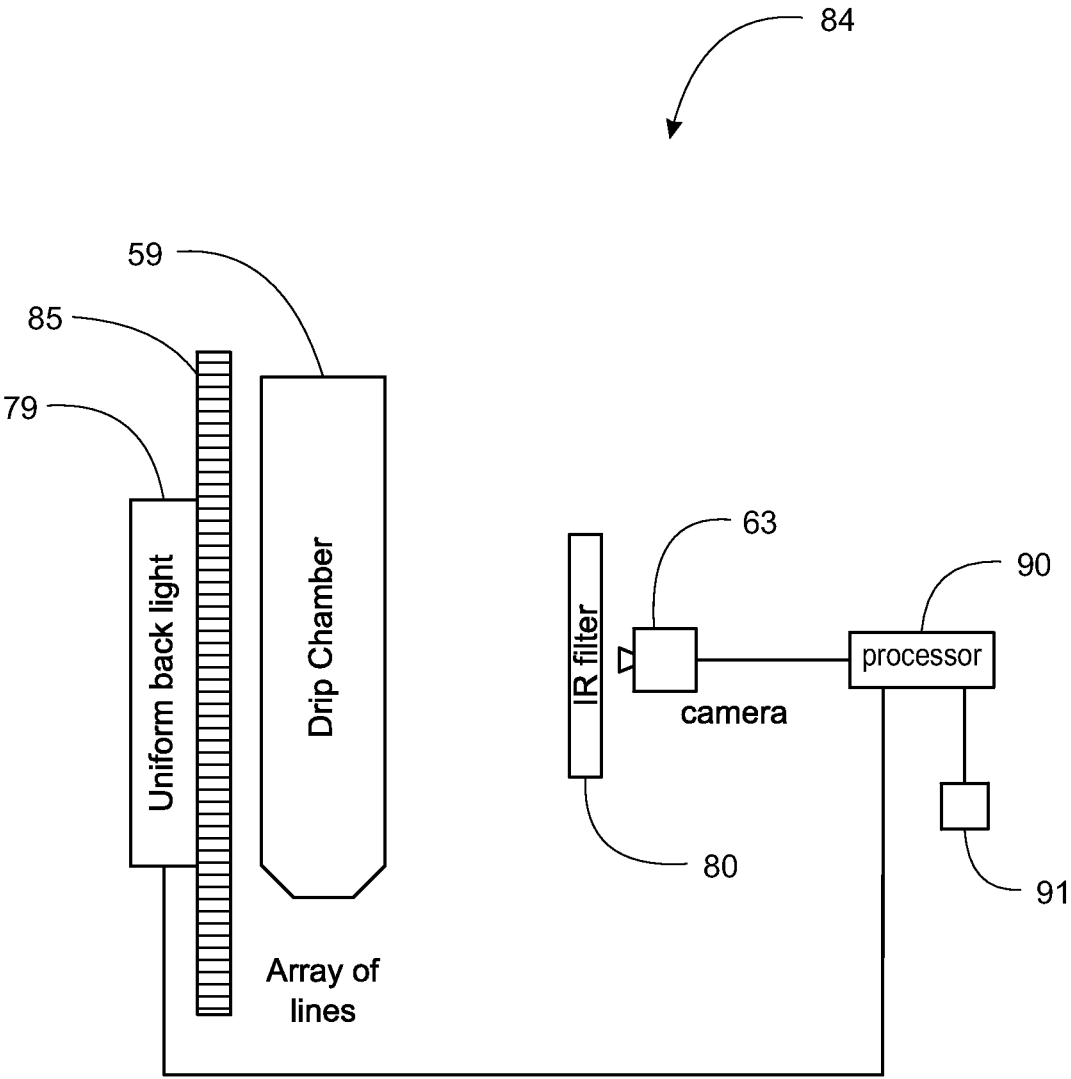


FIG. 14

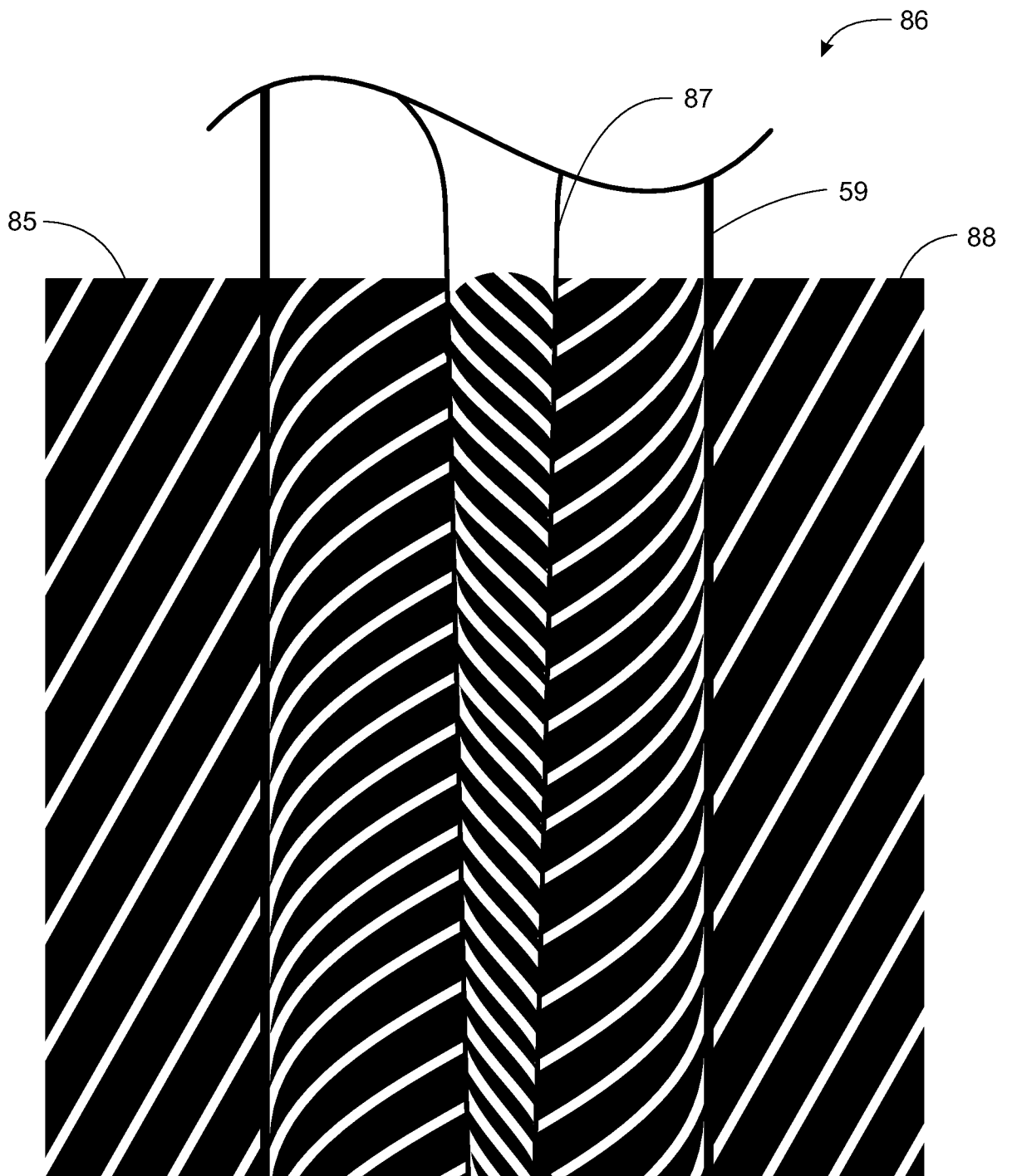
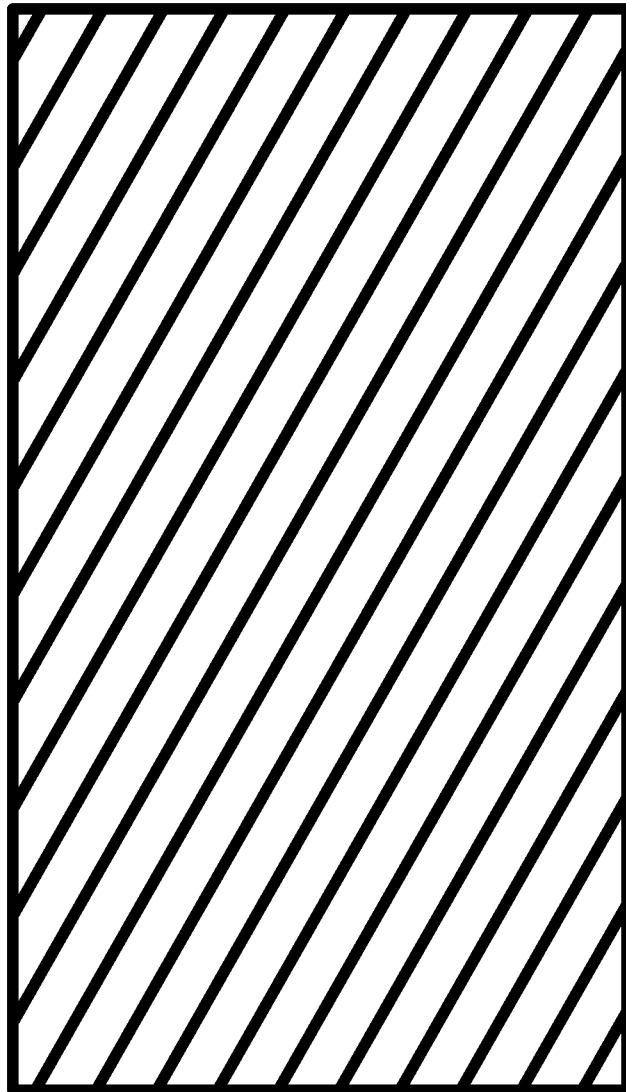


FIG. 15

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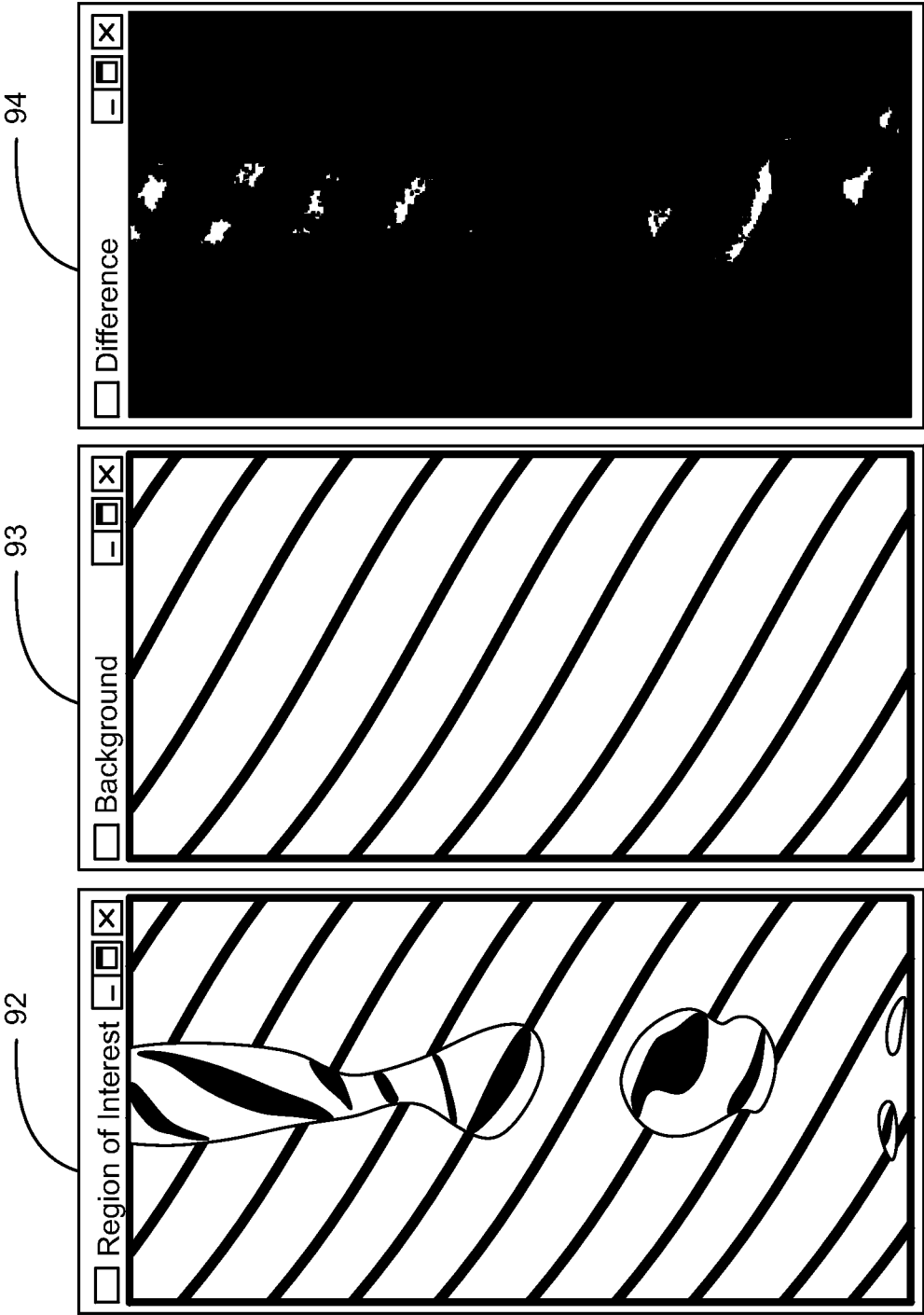
89



Typical background image

FIG. 16

+



Droplet image, background image, and difference between the background image and the droplet

FIG. 17

FIG. 18

FIG. 19

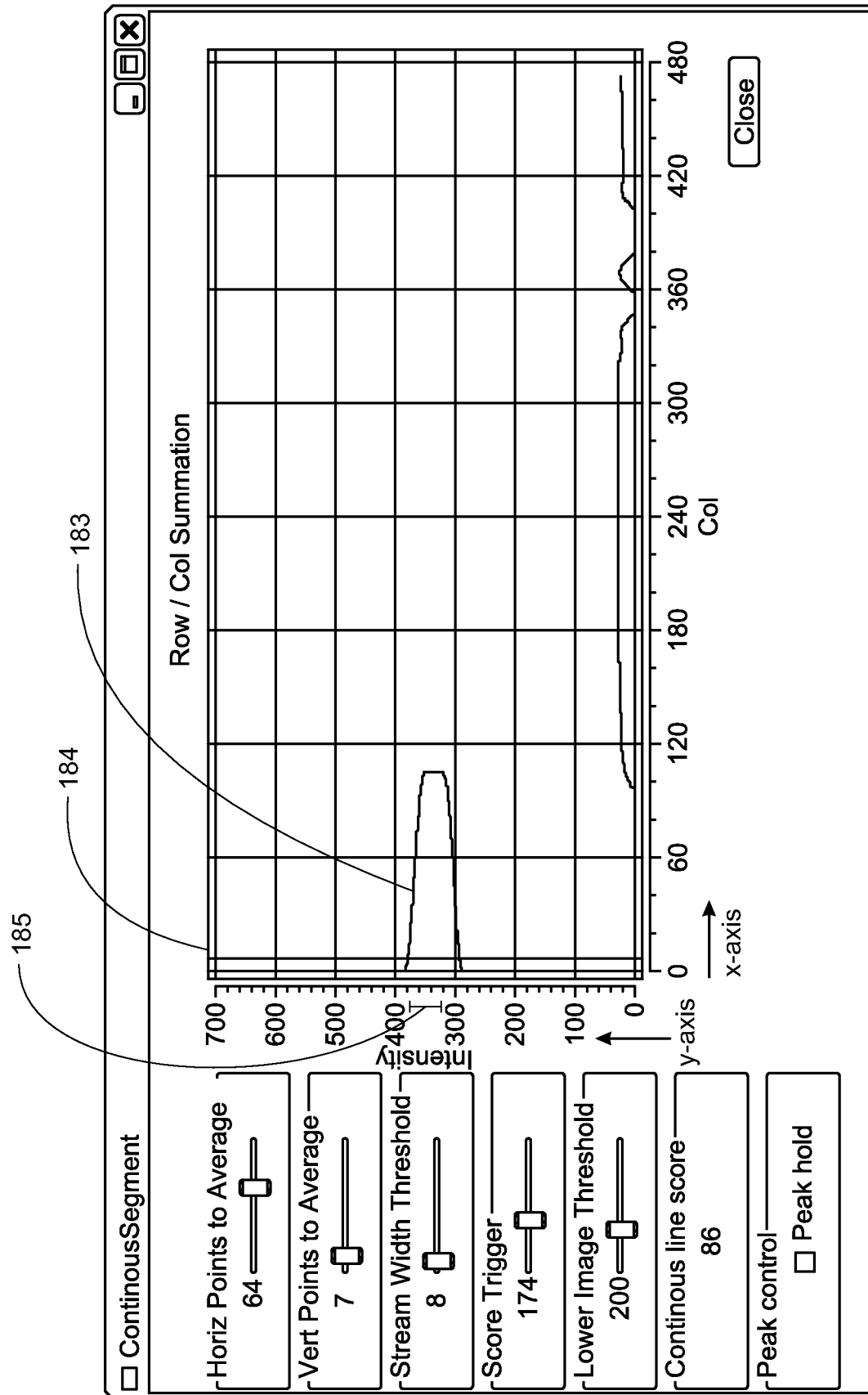


FIG. 20

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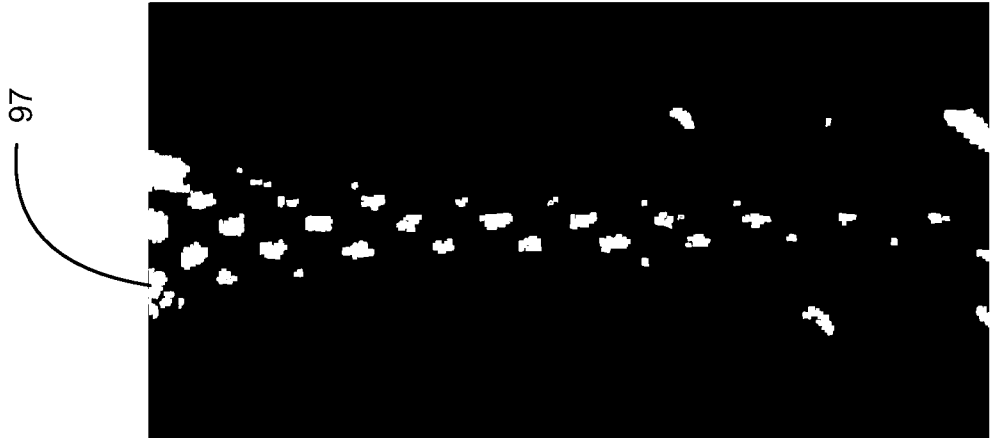


FIG. 23

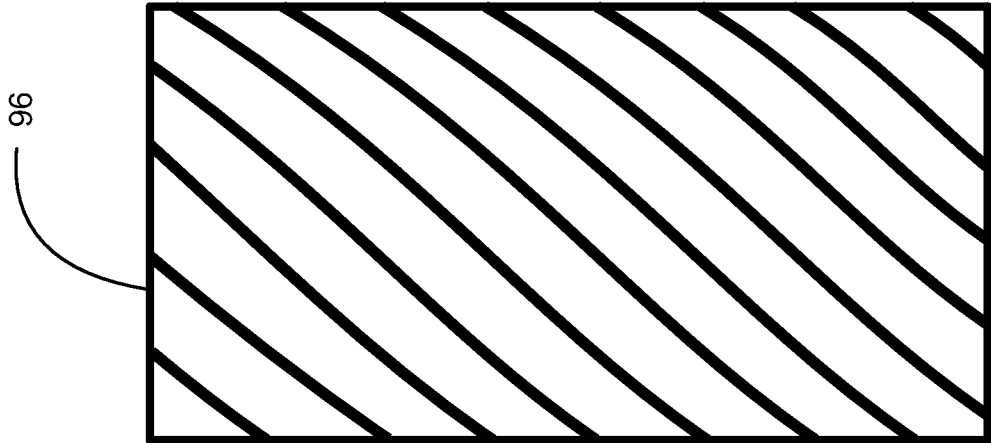


FIG. 22

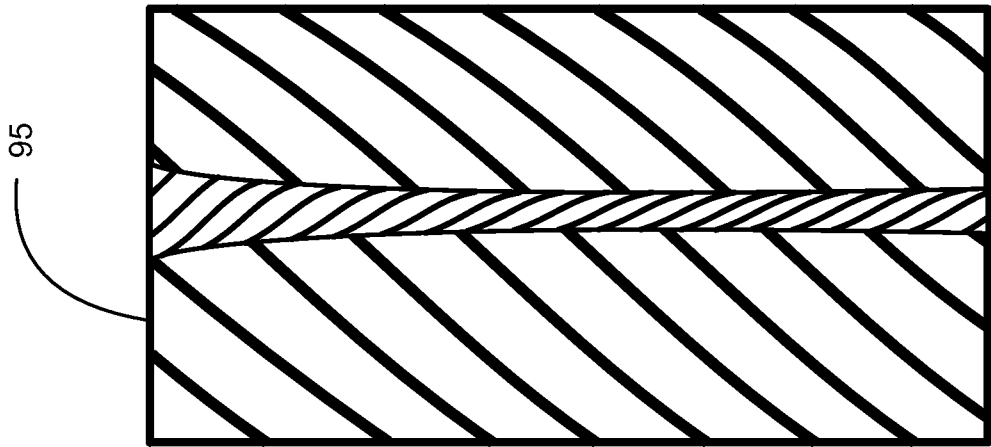


FIG. 21

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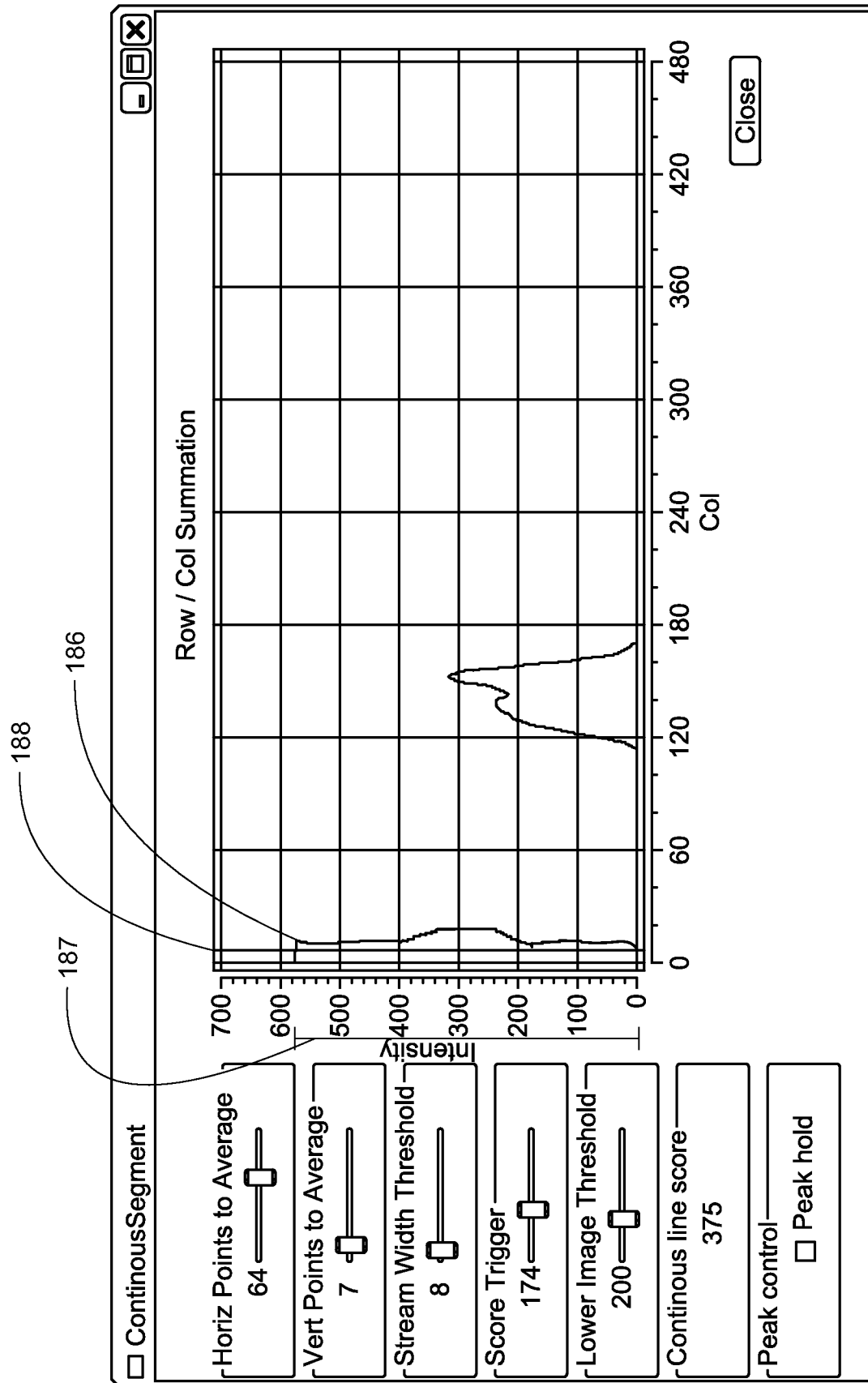


FIG. 24

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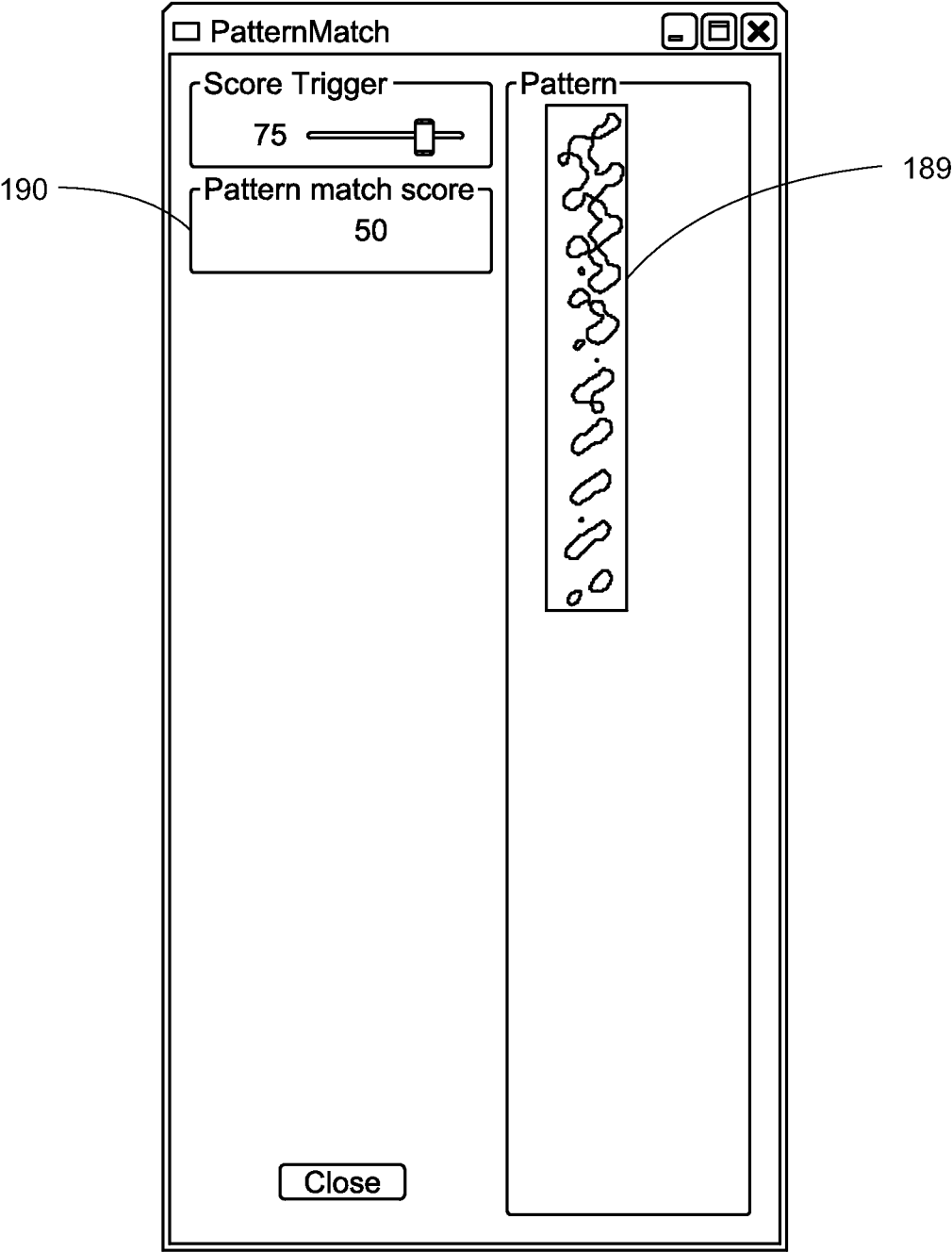


FIG. 25

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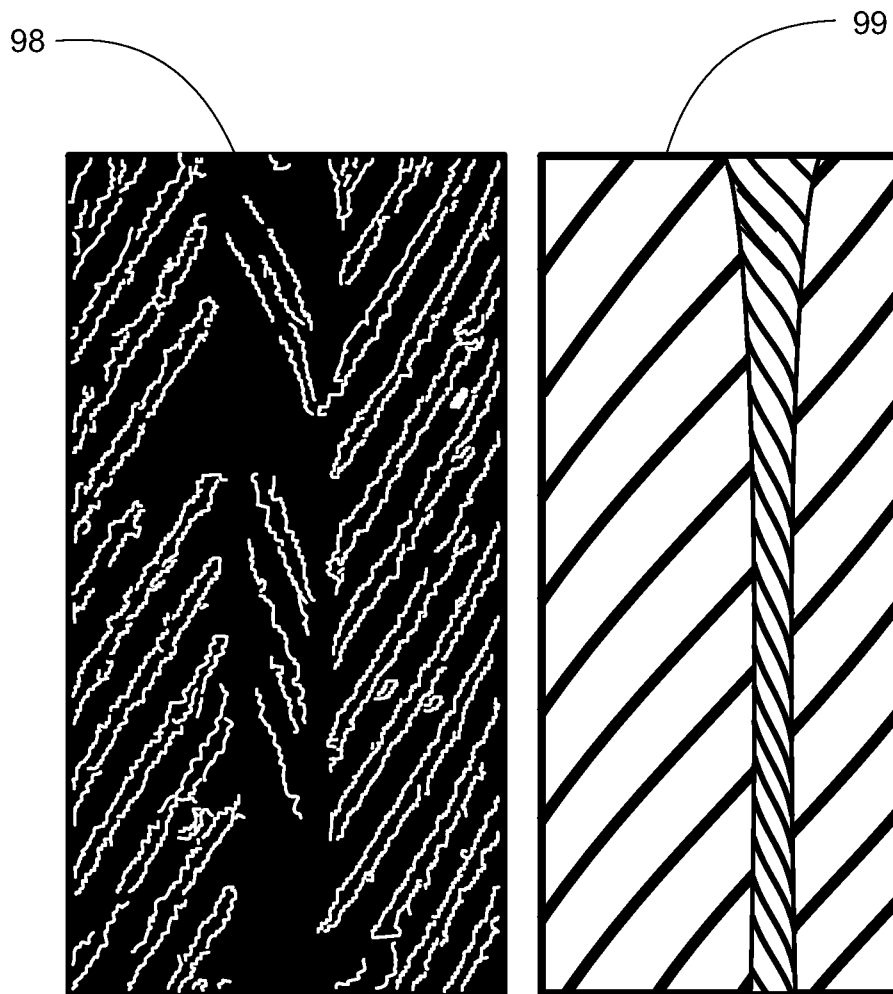


FIG. 26

FIG. 27

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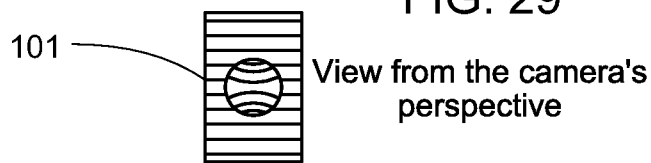
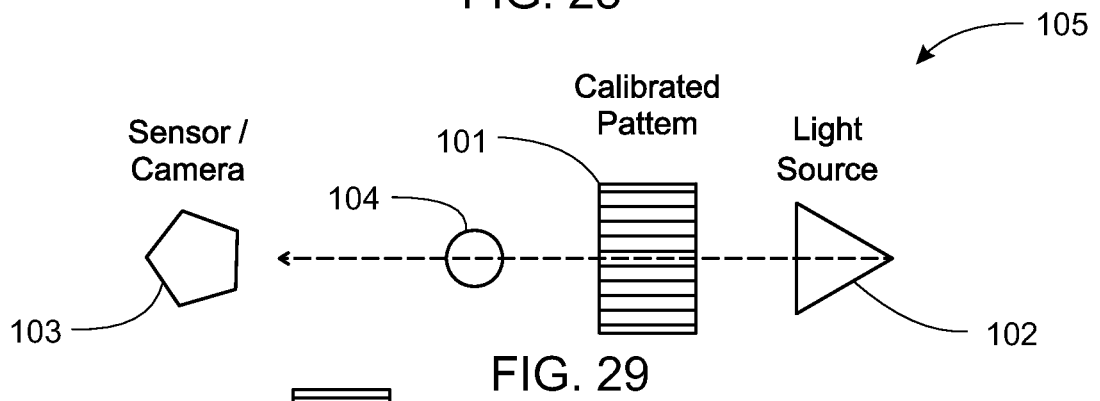
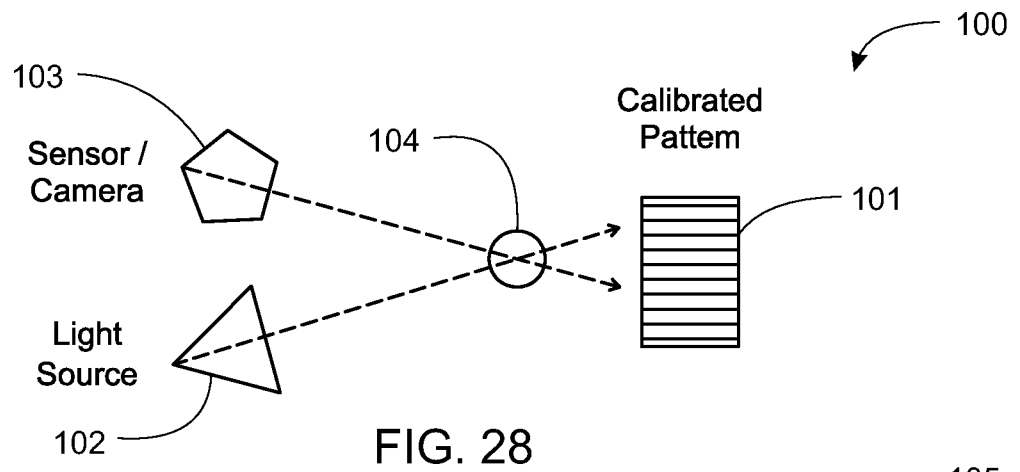


FIG. 30

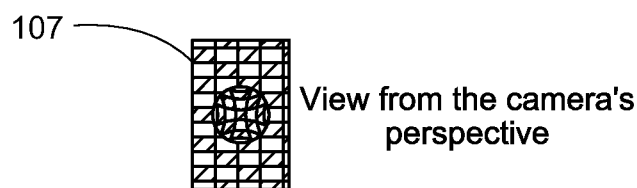
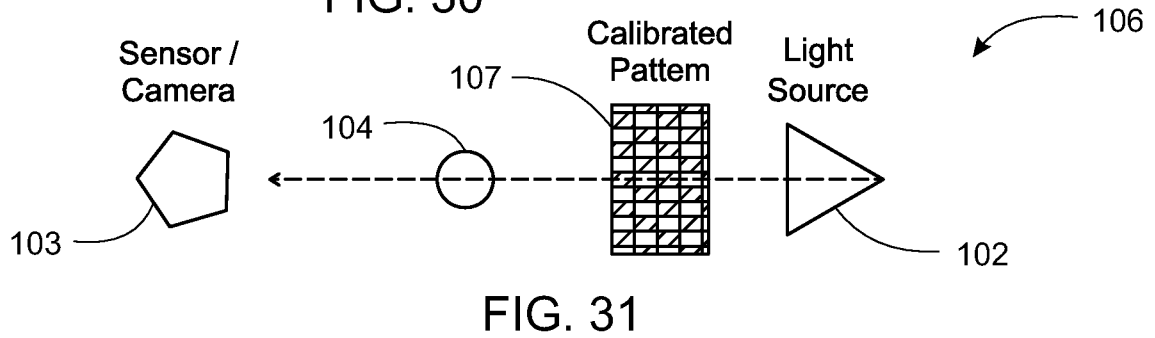


FIG. 32

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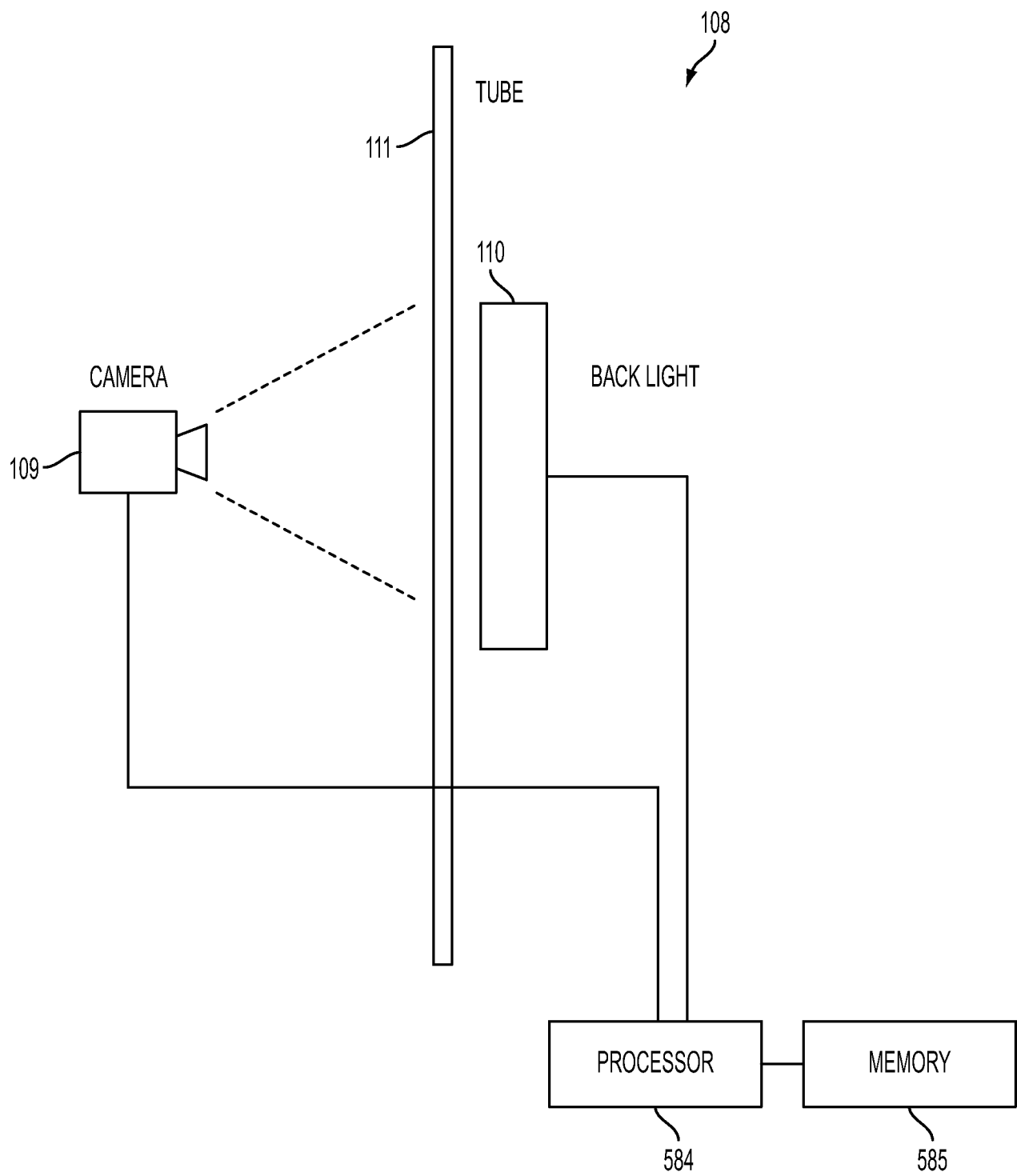


FIG. 33

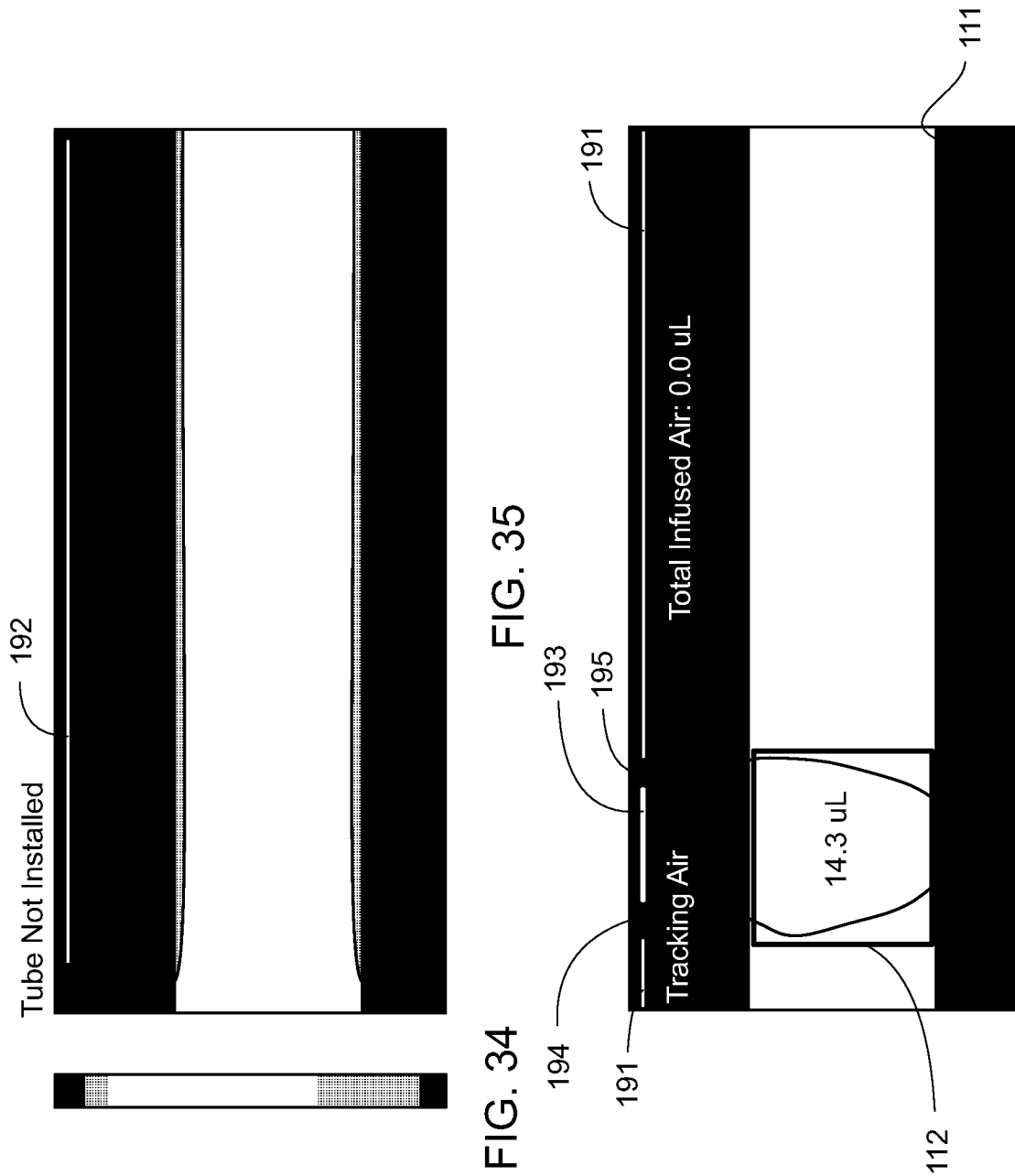


FIG. 36

Raw camera image: aspirated blood

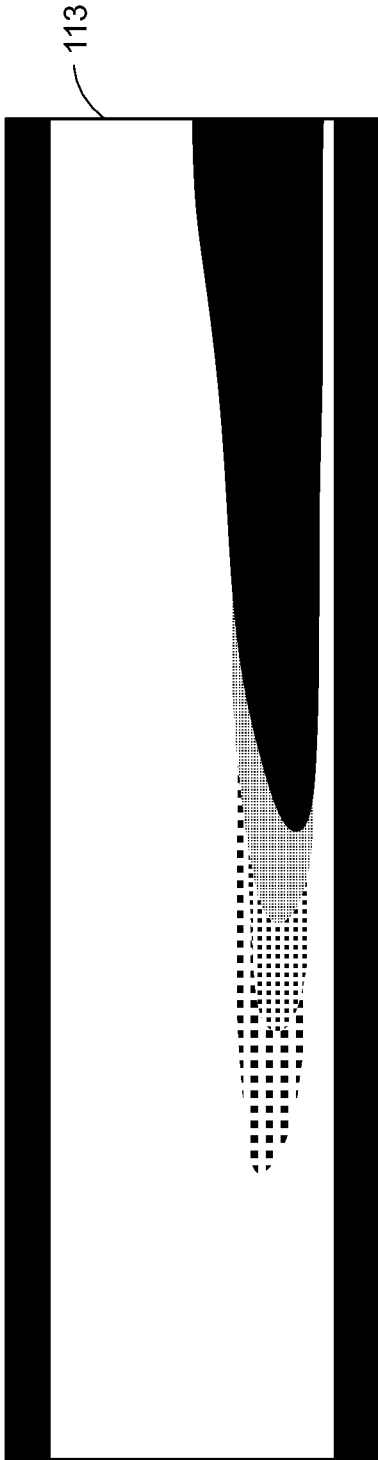


FIG. 37

Processed signal: aspirated blood

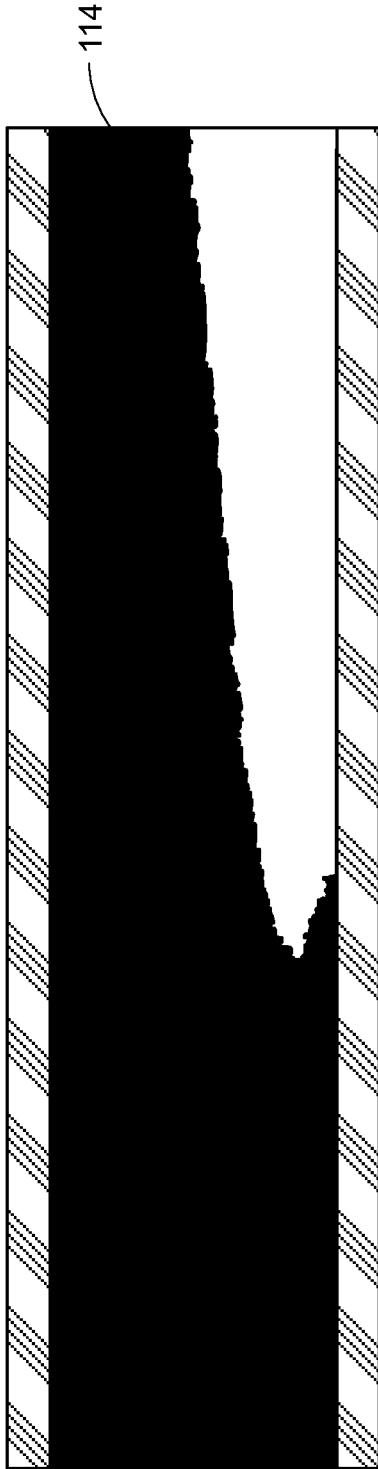


FIG. 38

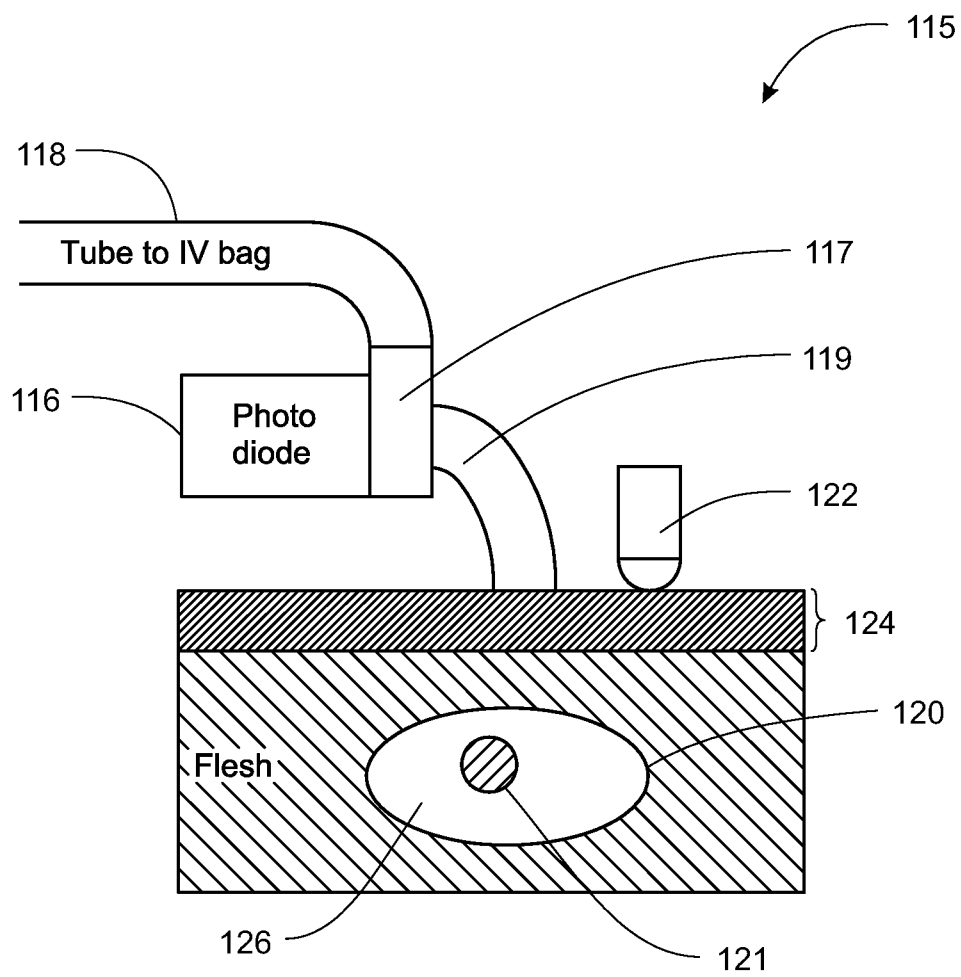


FIG. 39

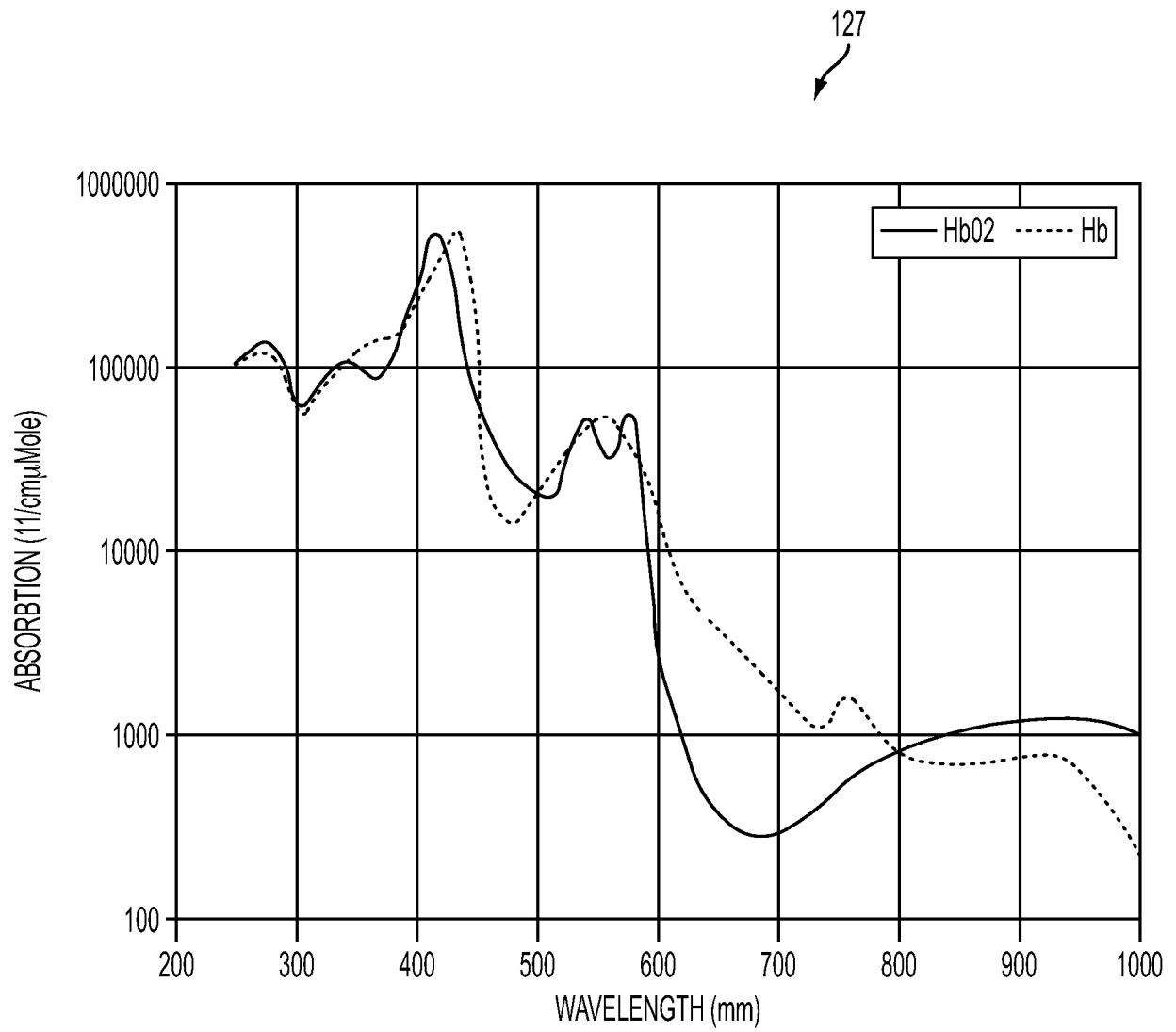


FIG. 40

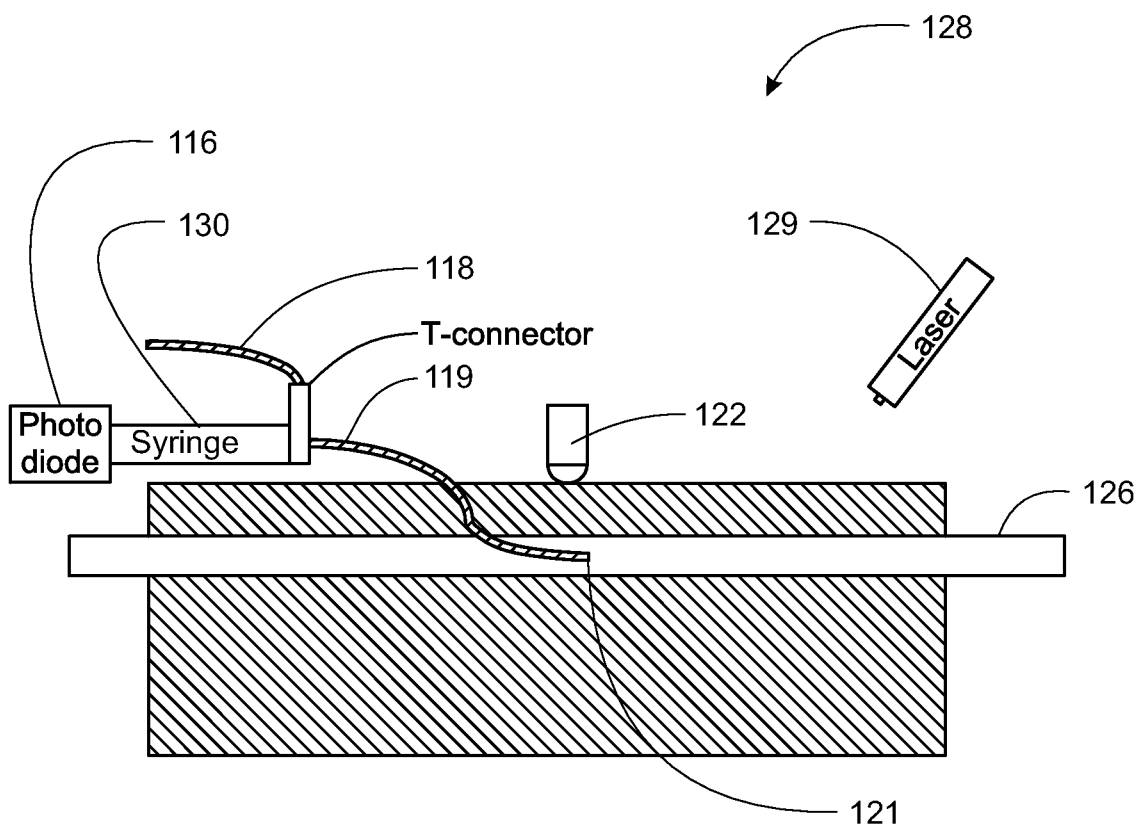


FIG. 41

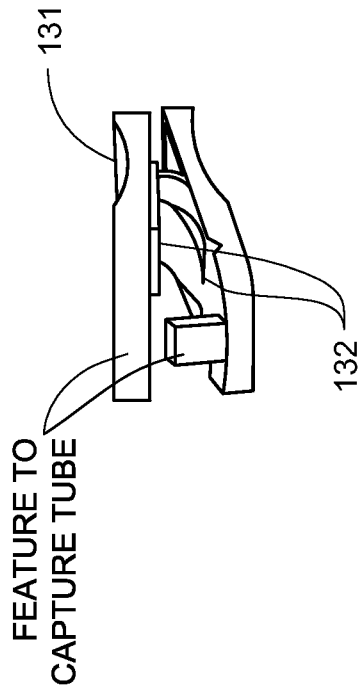


FIG. 42

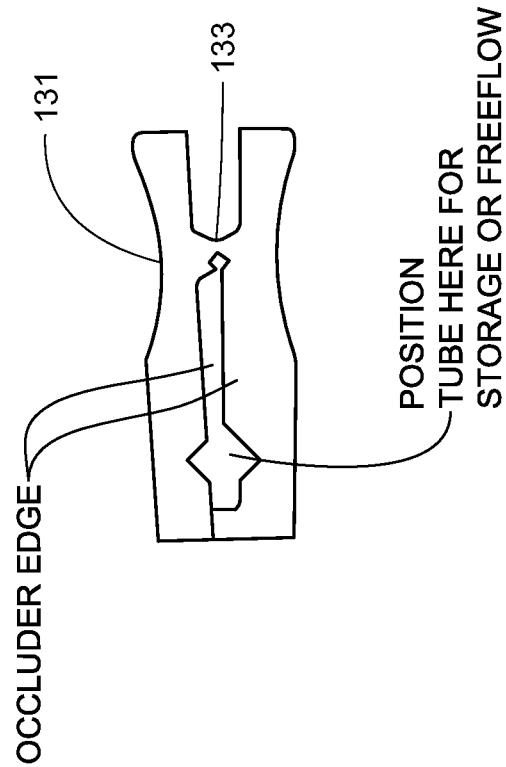


FIG. 43

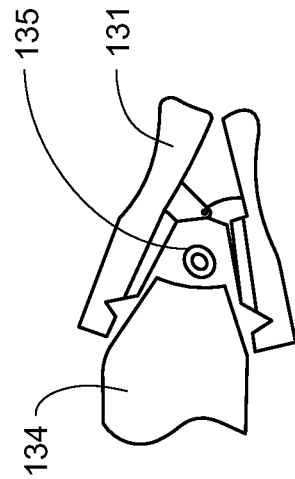


FIG. 44

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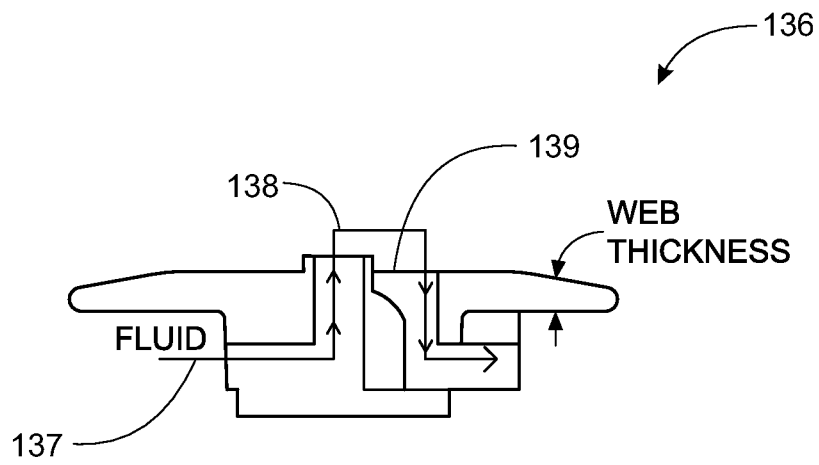


FIG. 45

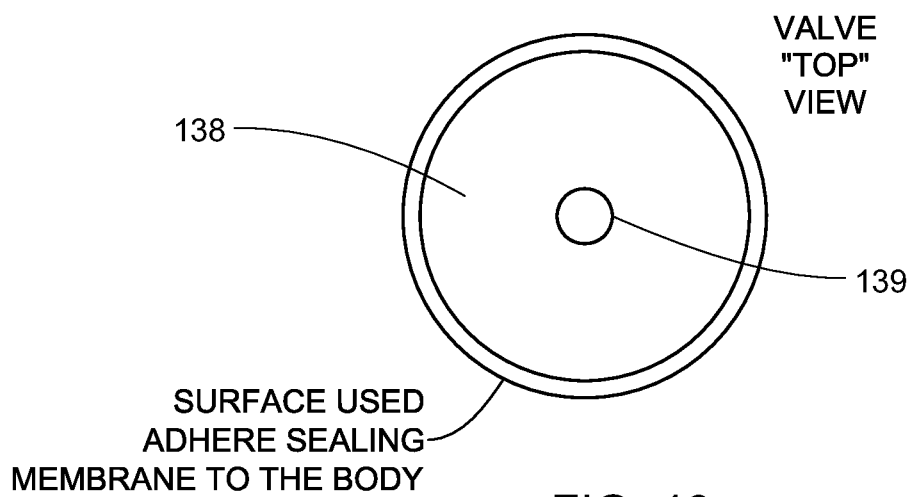


FIG. 46

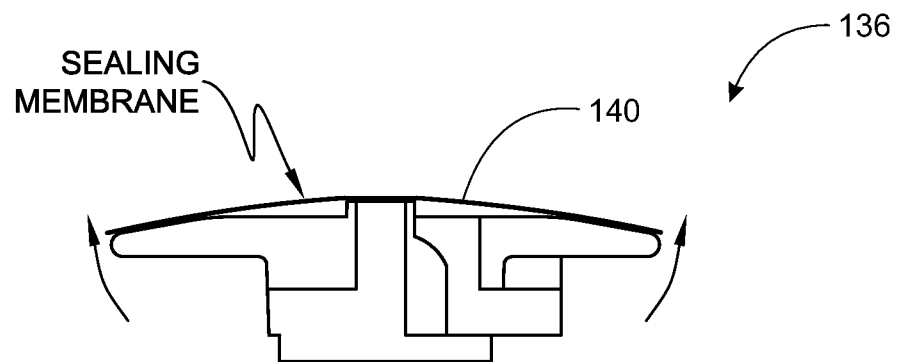


FIG. 47

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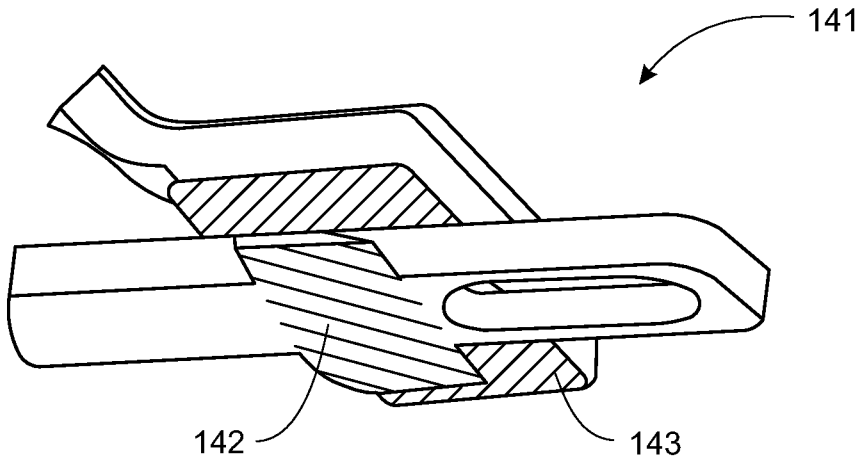


FIG. 48

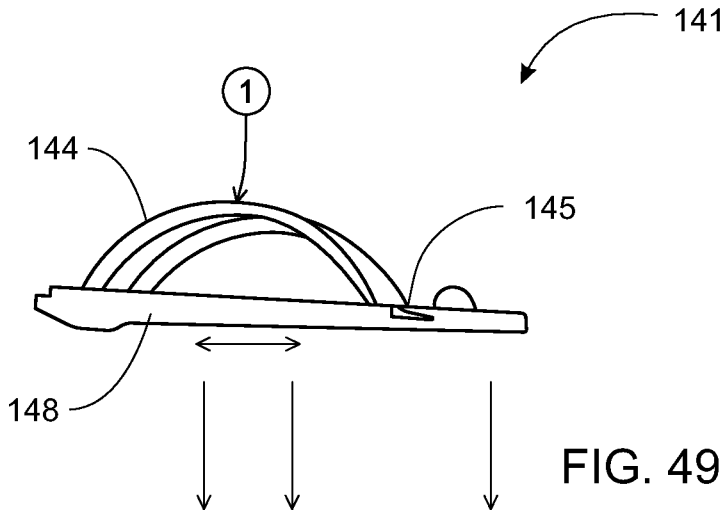


FIG. 49

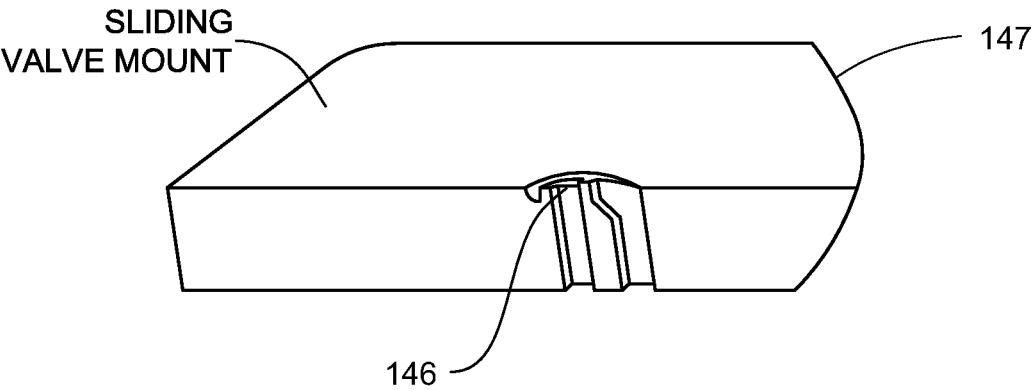
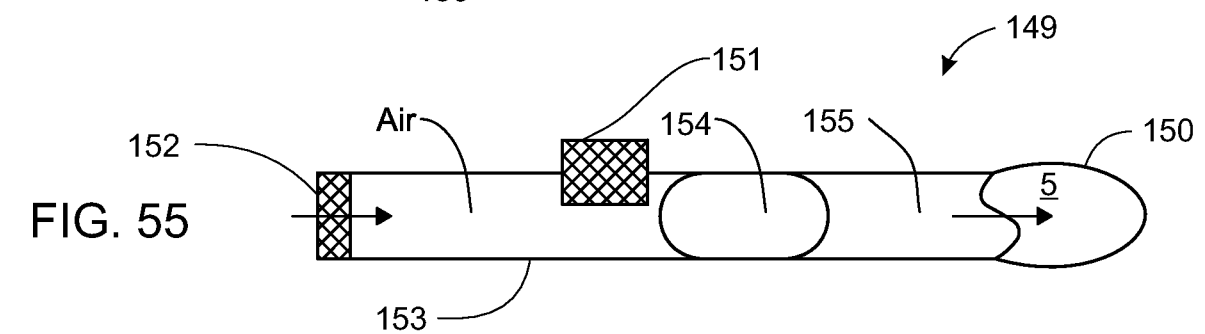
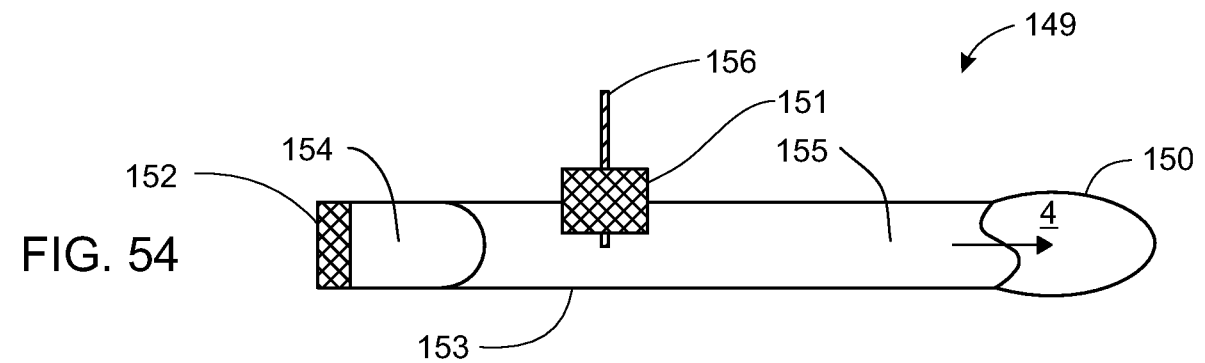
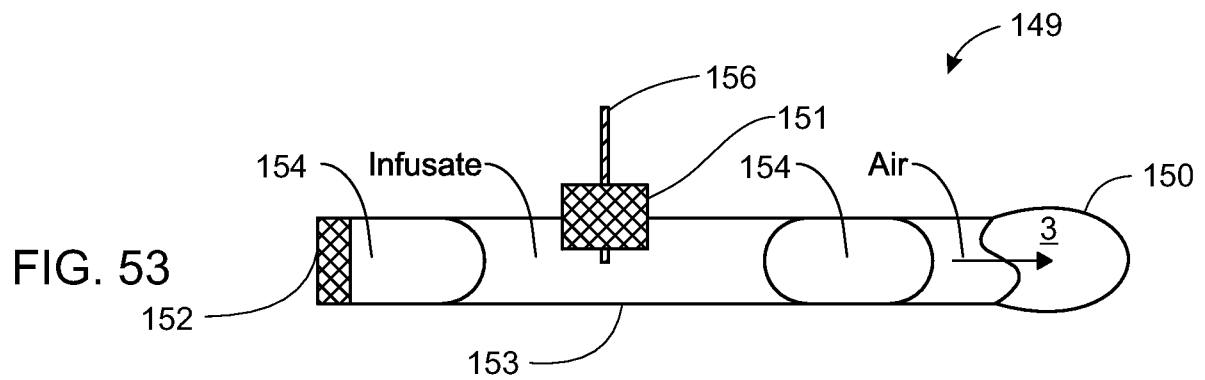
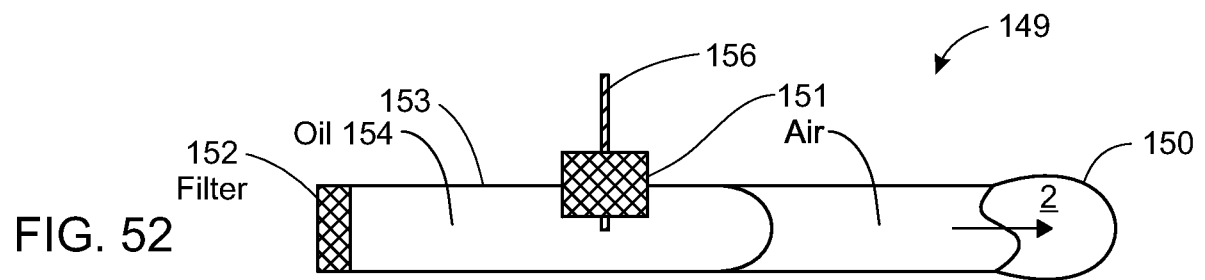
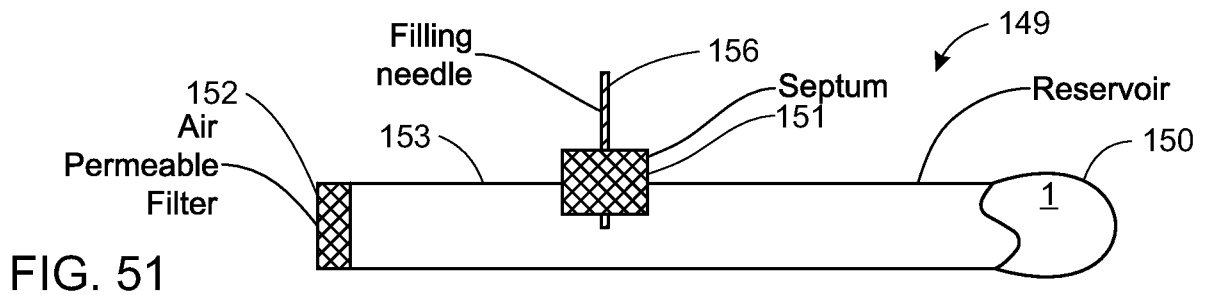


FIG. 50

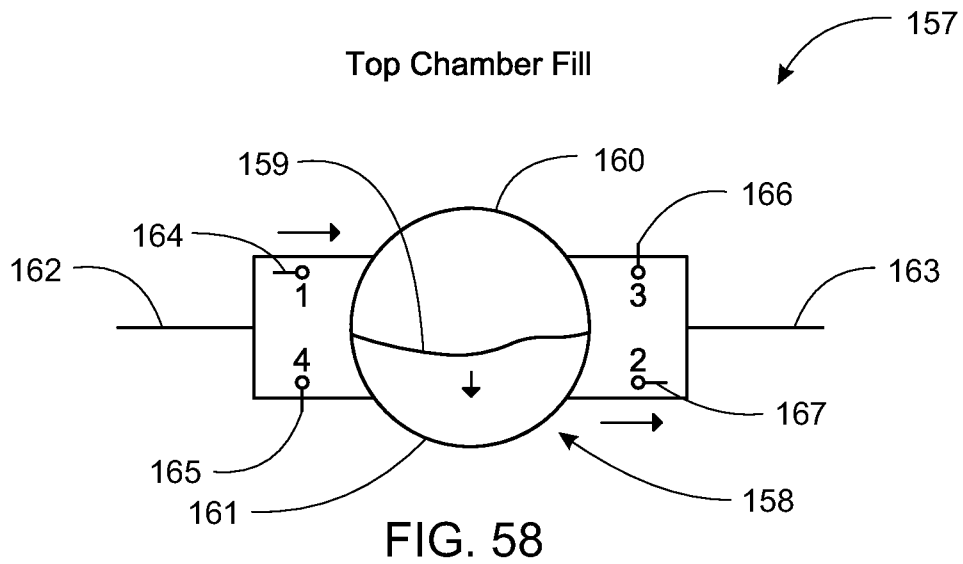
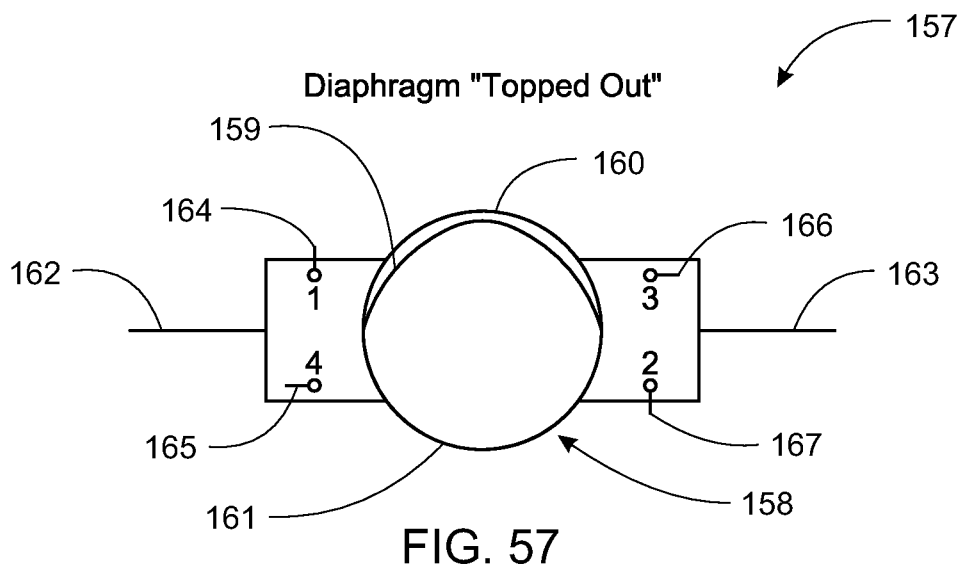
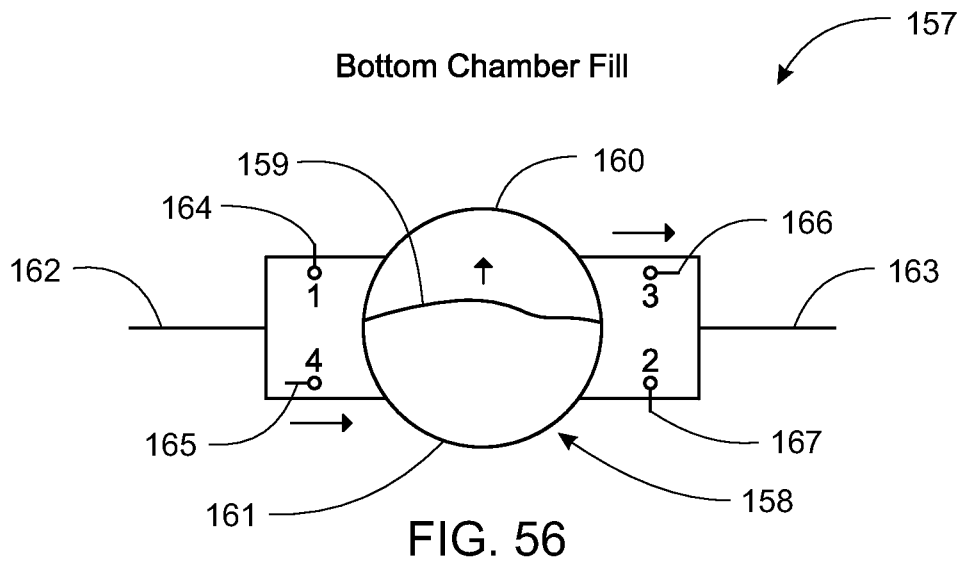
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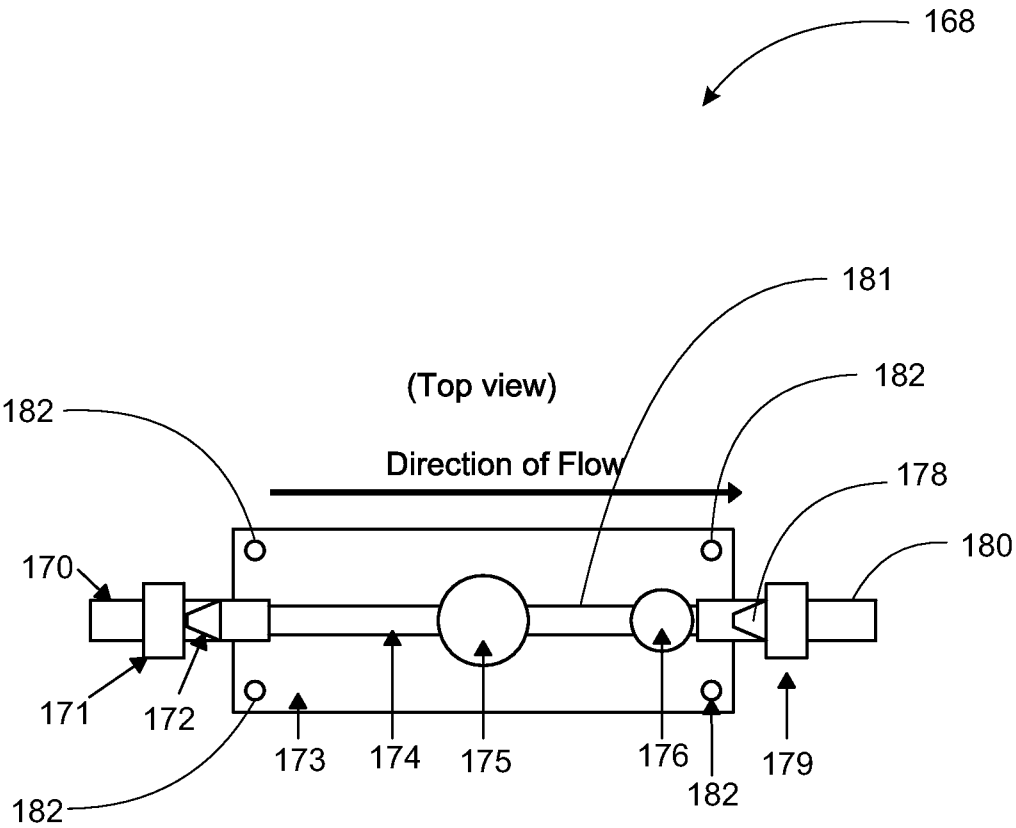
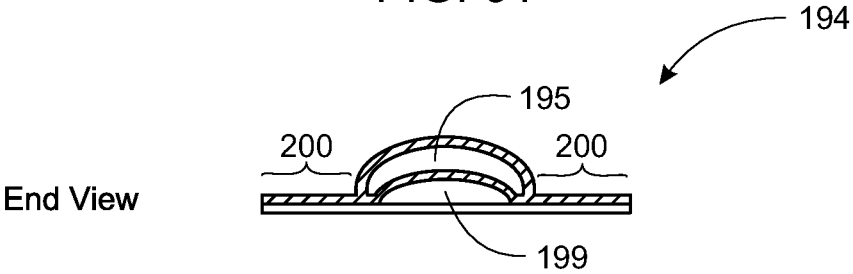
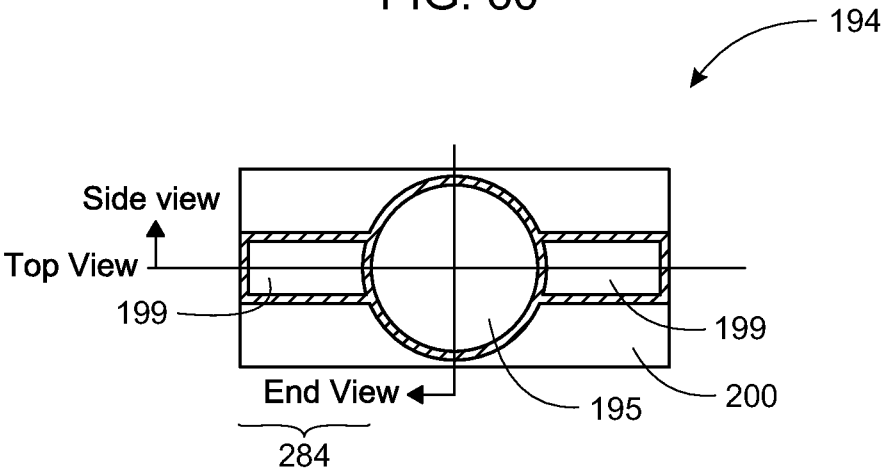
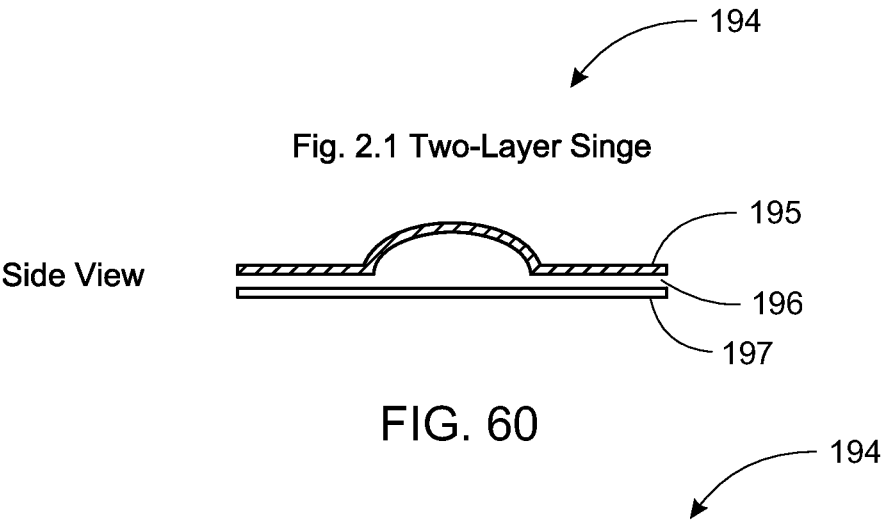


FIG. 59

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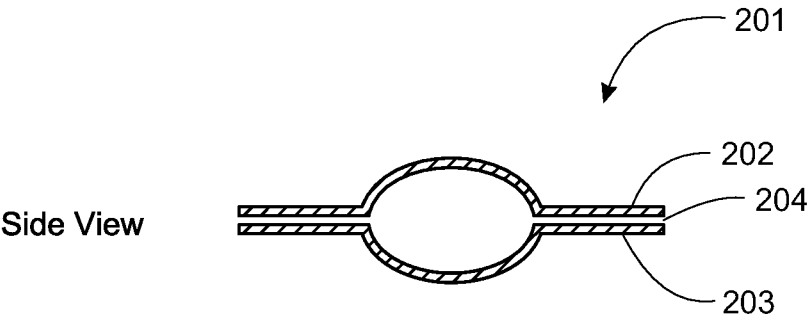


FIG. 63

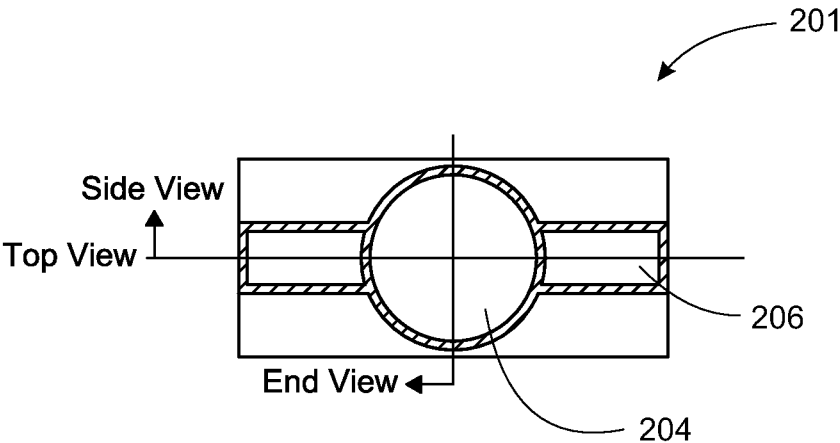


FIG. 64

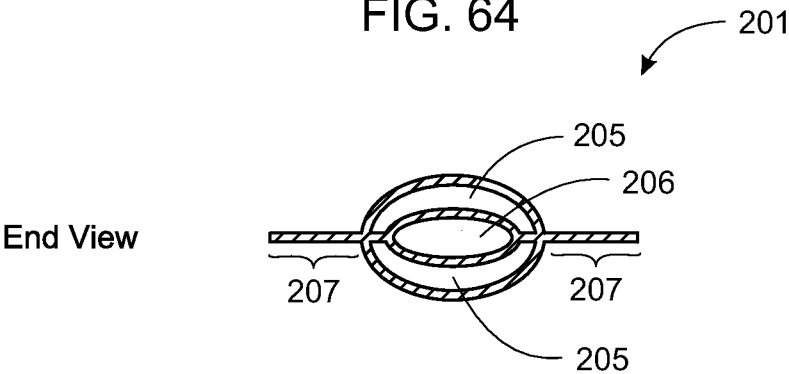


FIG. 65

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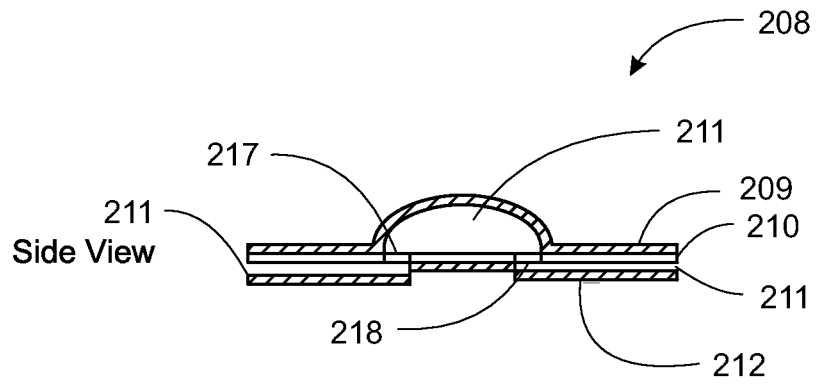


FIG. 66

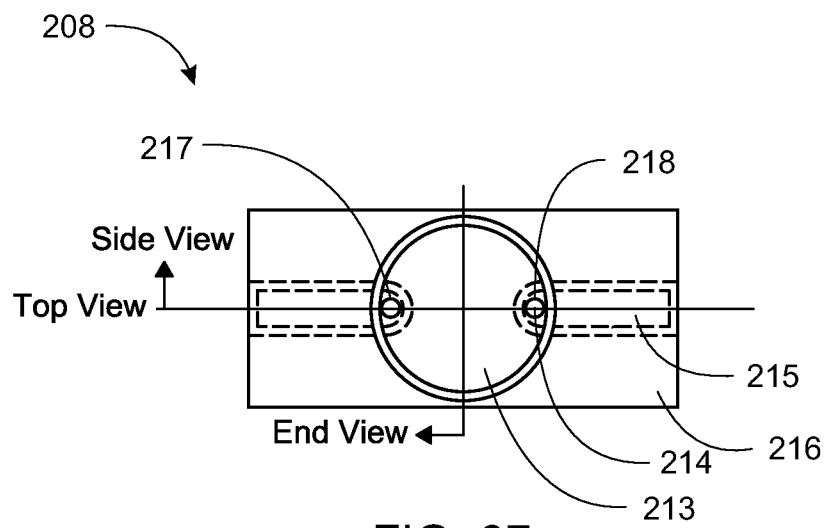


FIG. 67

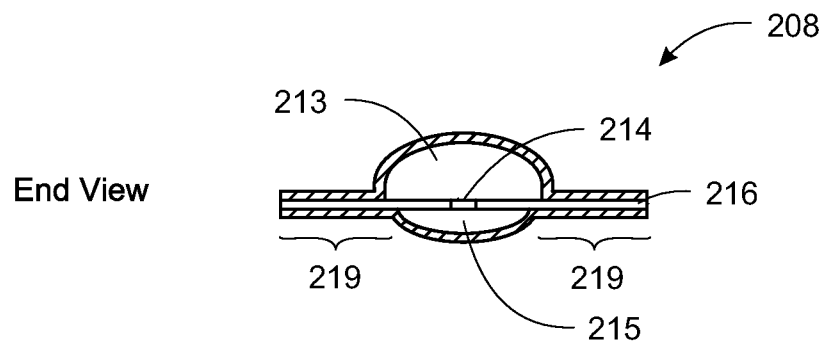


FIG. 68

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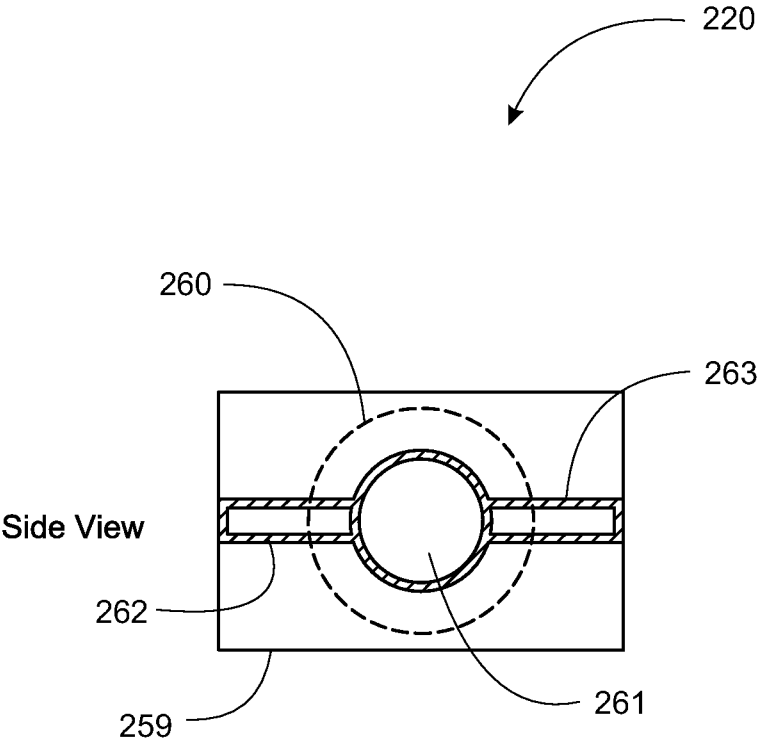


FIG. 69

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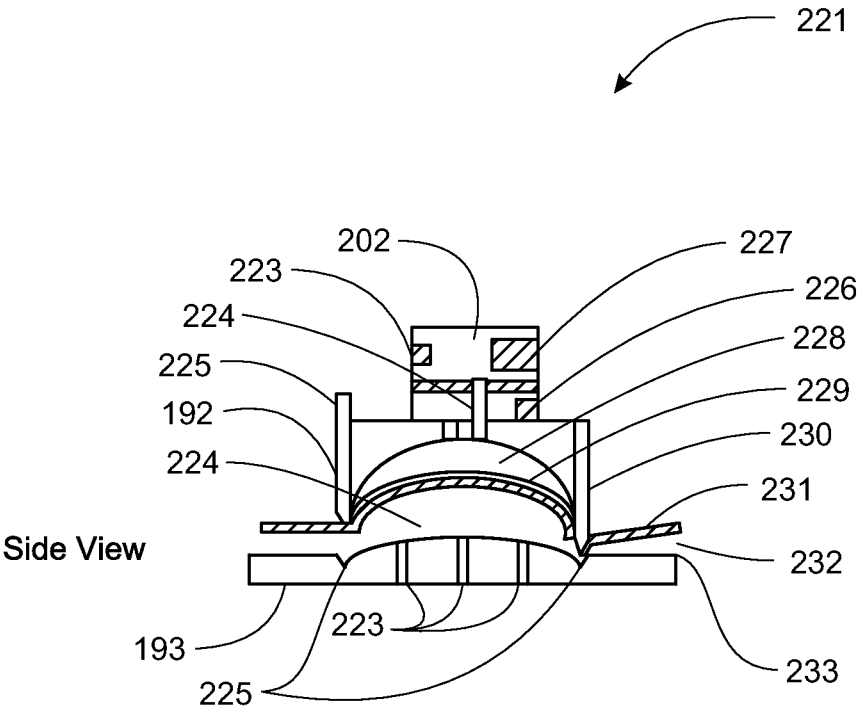


FIG. 70

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Fig. 3.2 Double Sided AVS with Integral Perimeter Seal Valves

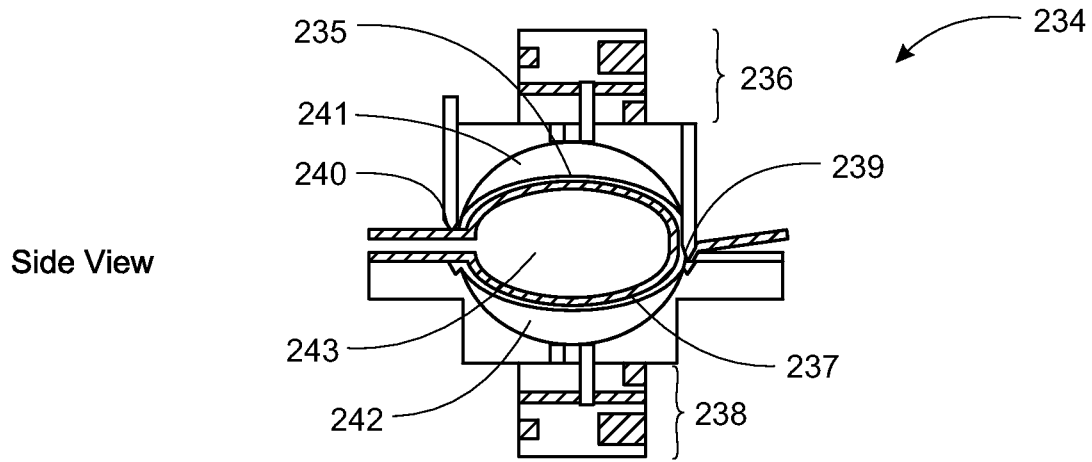


FIG. 71

Fig. 3.3 3-D AVS with Integral Perimeter Seal Valves

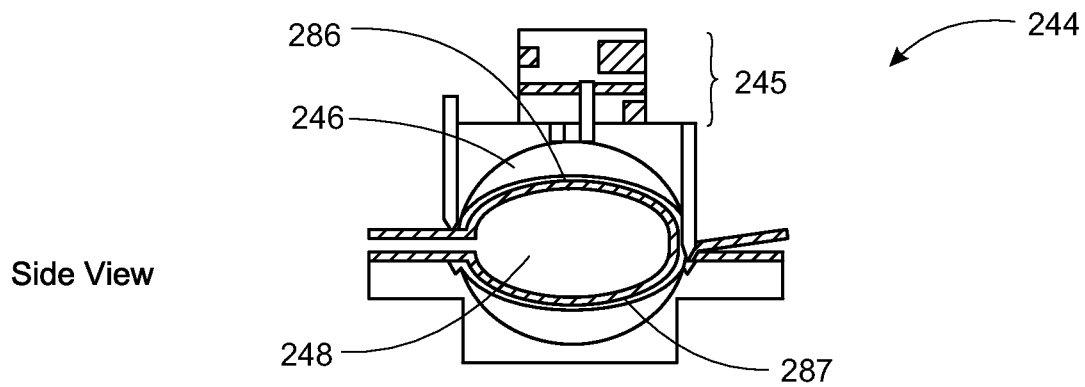


FIG. 72

Fig. 3.4 Three-Layer Single Sided AVS with Piston Valves

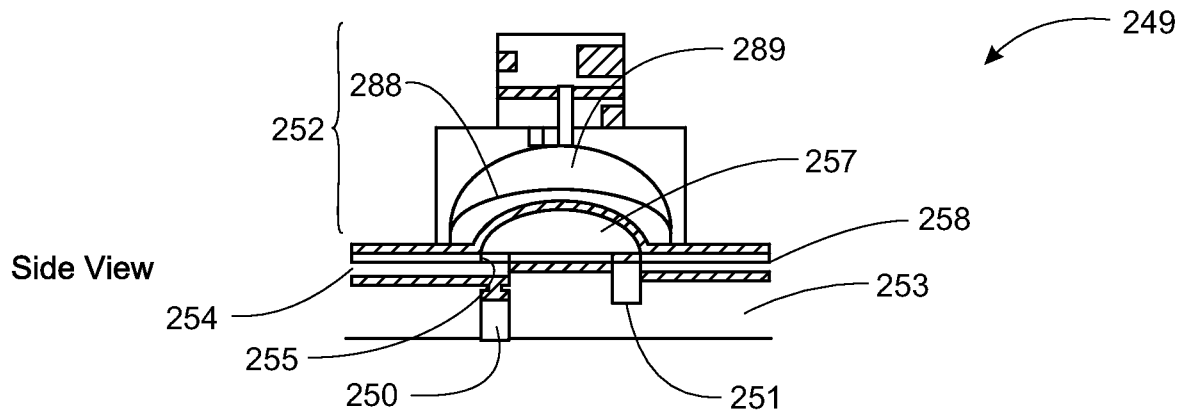


FIG. 73

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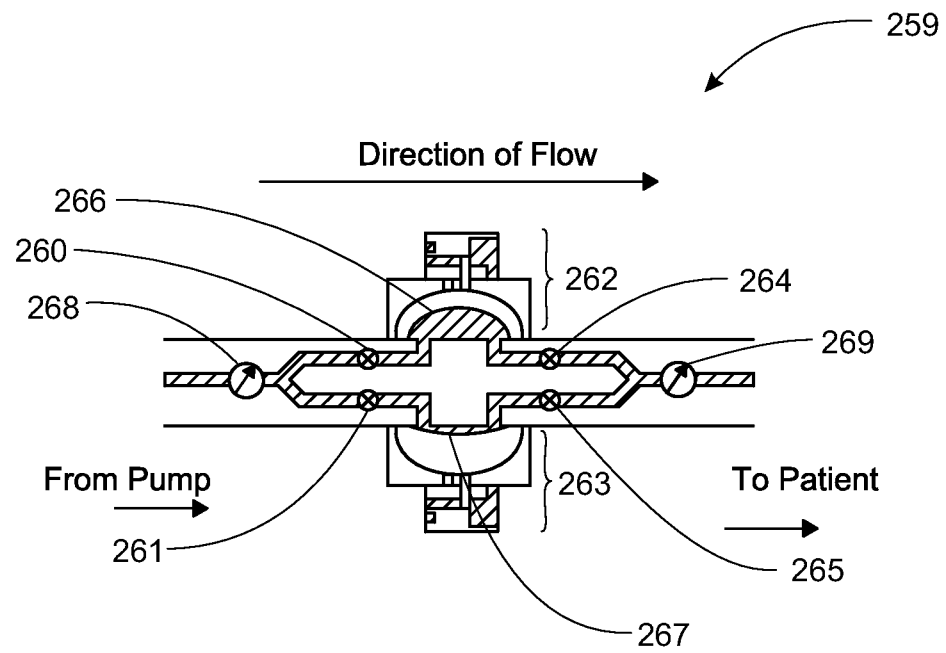


FIG. 74

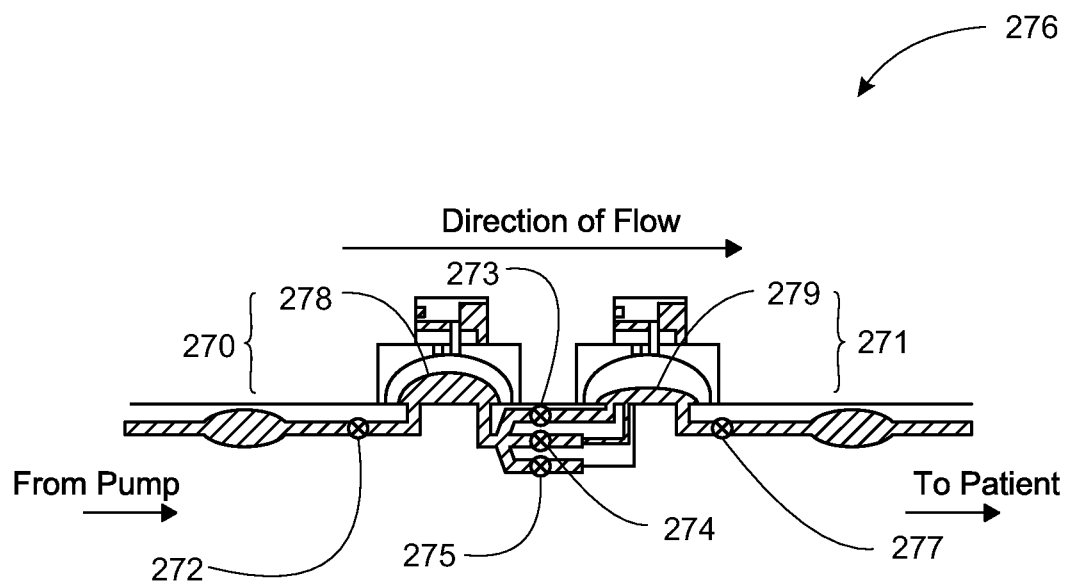


FIG. 75

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Figure 1: Example Active Fill/Passive Empty Pumping AVS

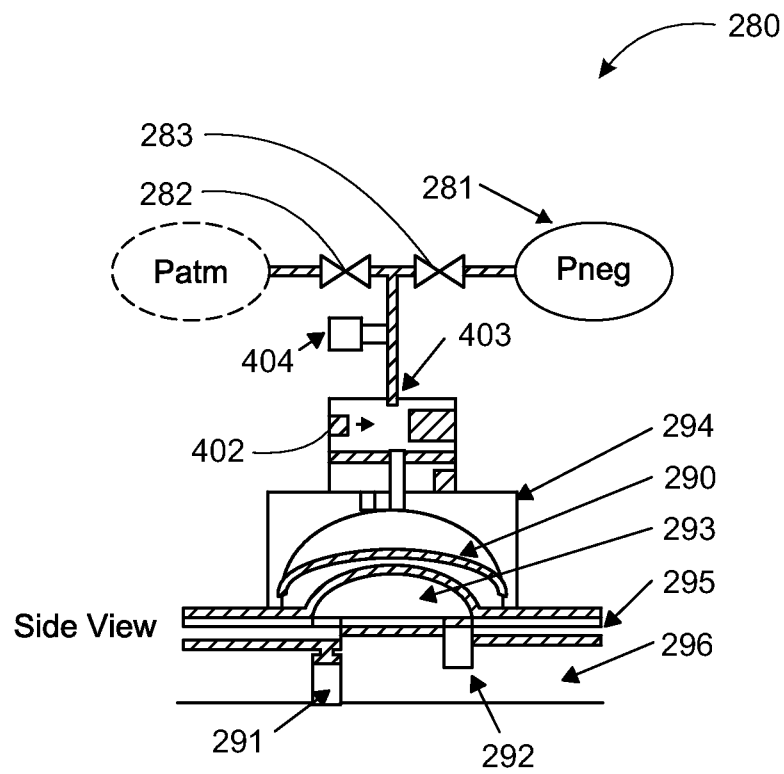


FIG. 76

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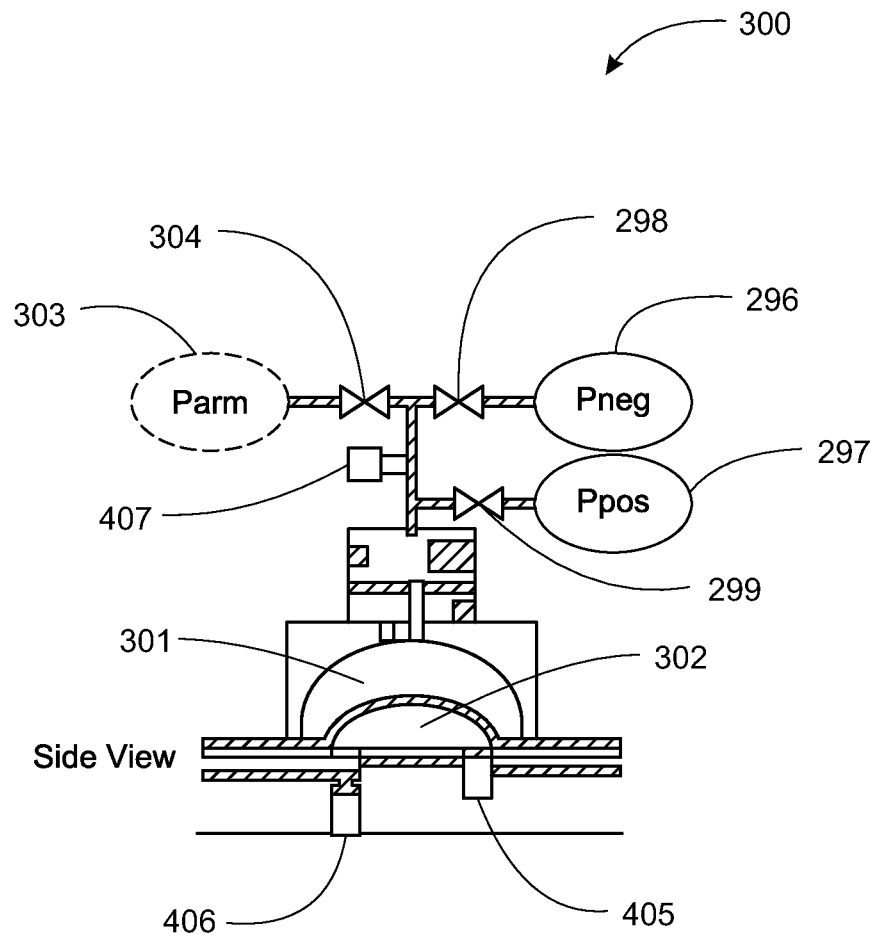


FIG. 77

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Figure 1: Example Optical Line Pressure

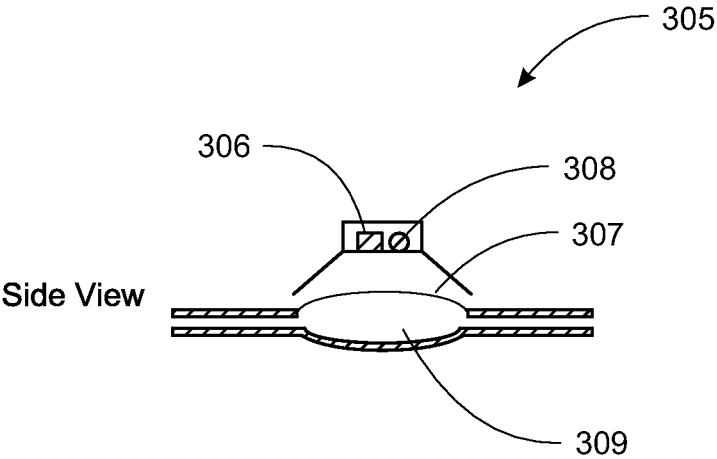


FIG. 78

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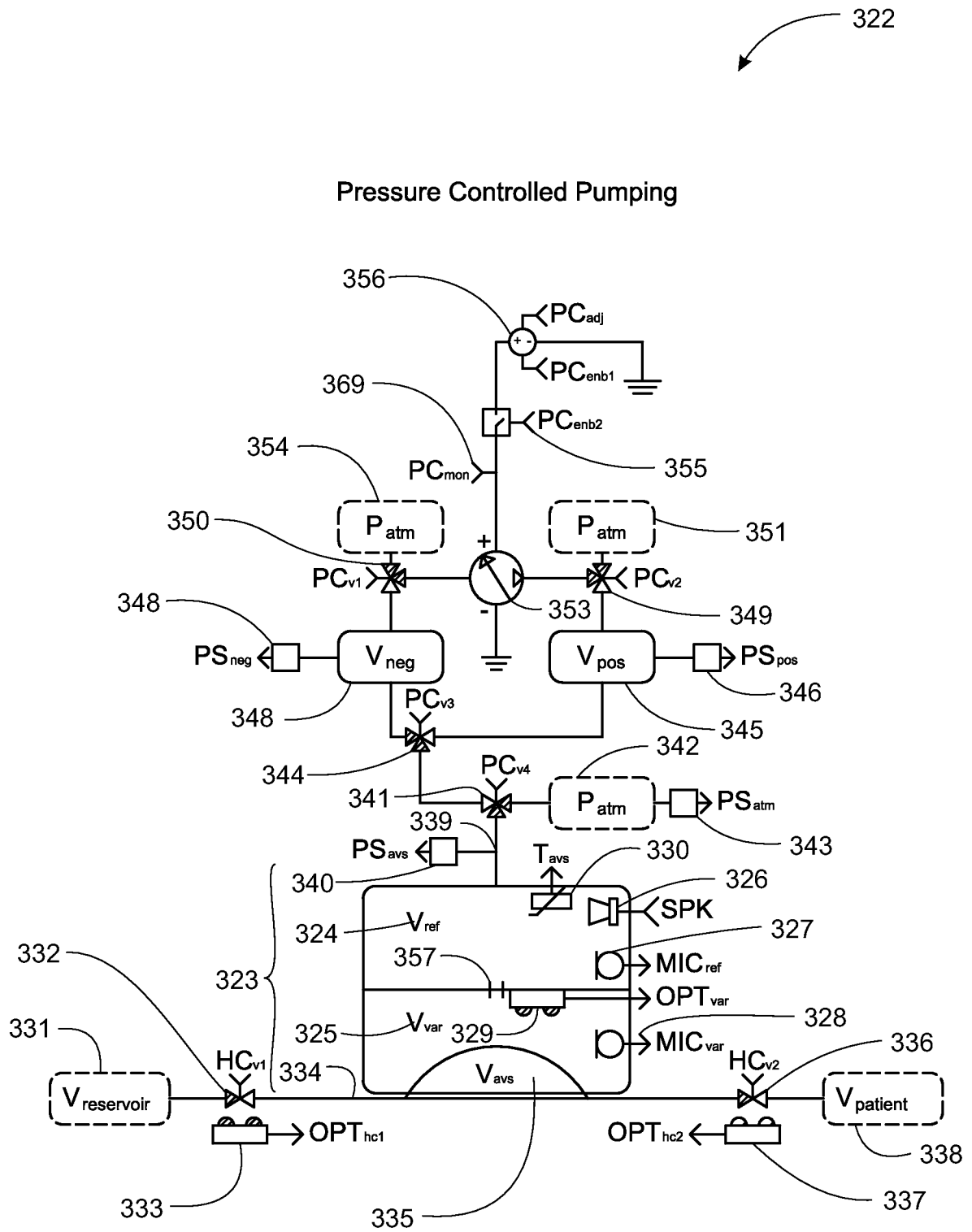


Fig. 79

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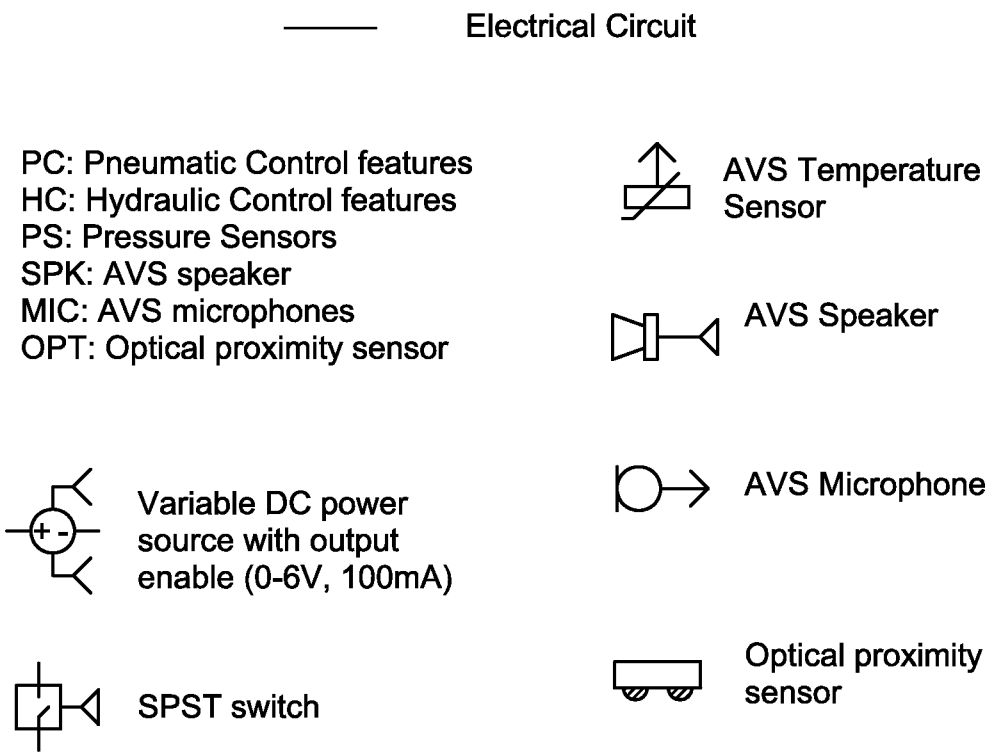


FIG. 80

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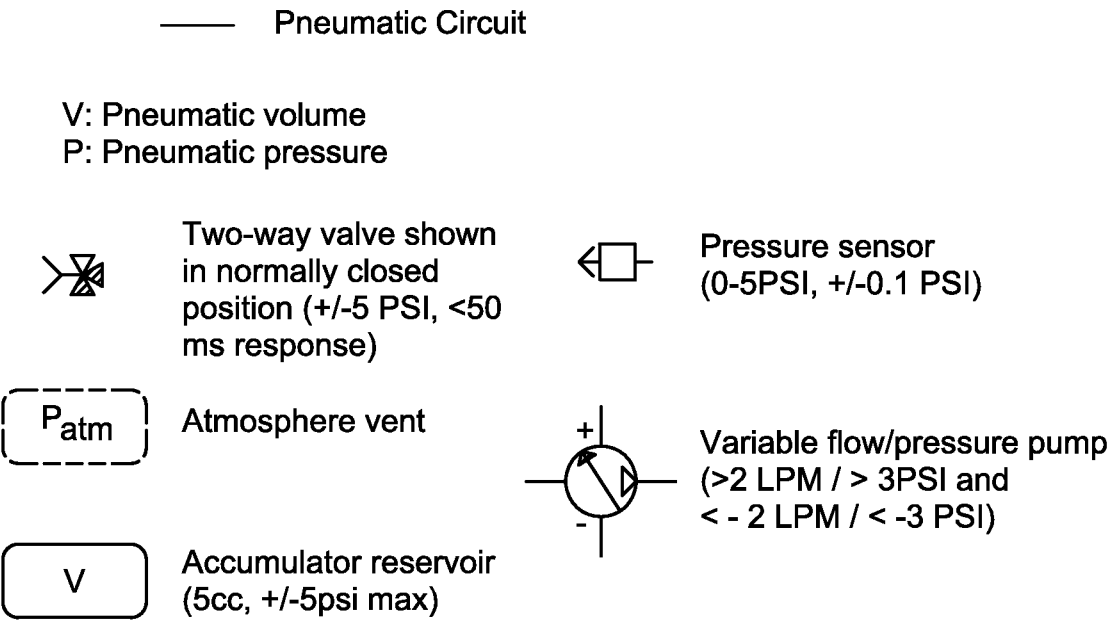


FIG. 81

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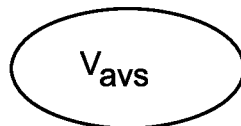
+

————— Hydraulic Circuit

V: Hydraulic volume



One-way valve shown
in normally closed
position (> 2x PSI
withstand of pump
pressure)

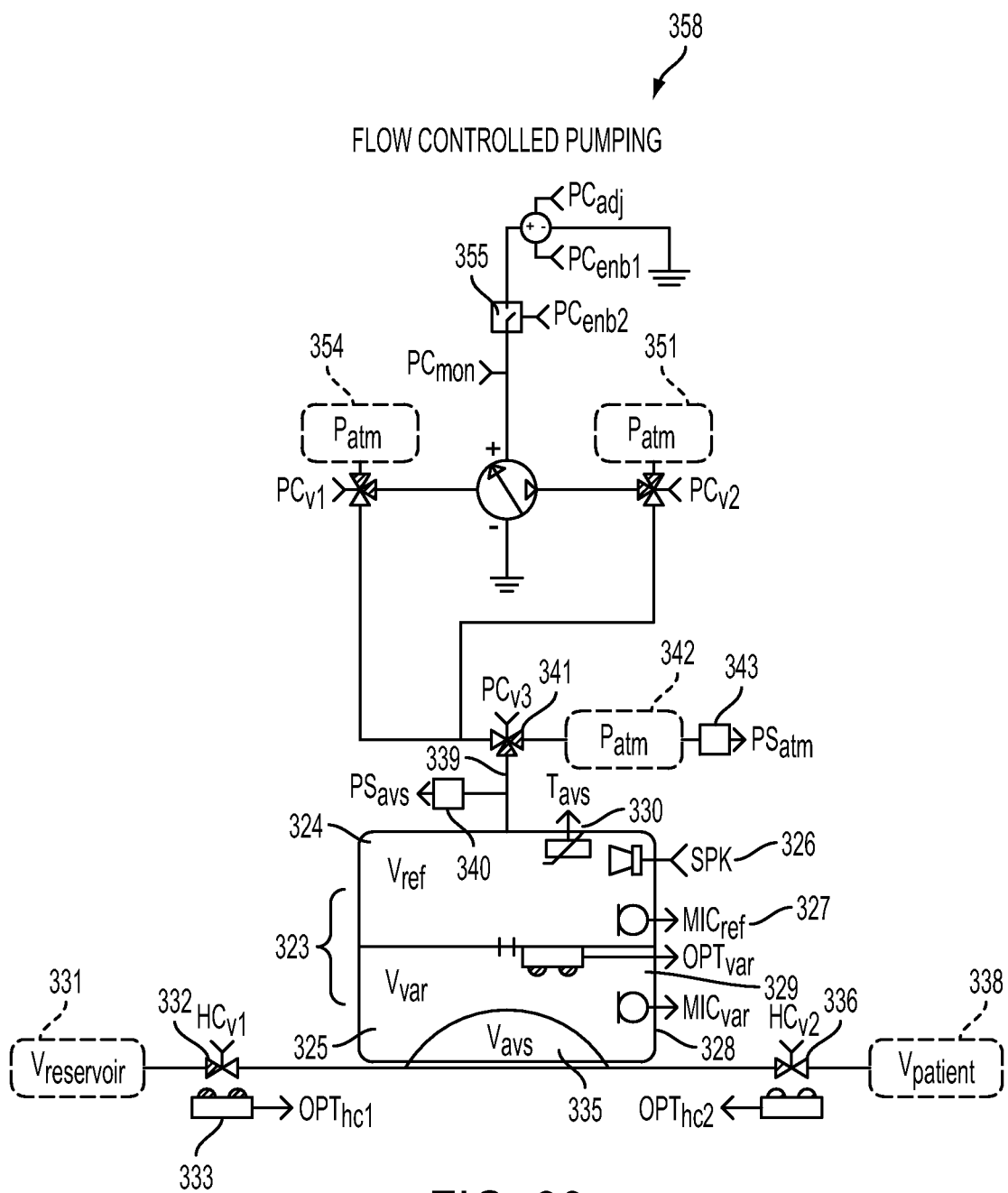


AVS compliant
chamber volume
(0.5 cc nom)

Note: Valve in disposable

FIG. 82

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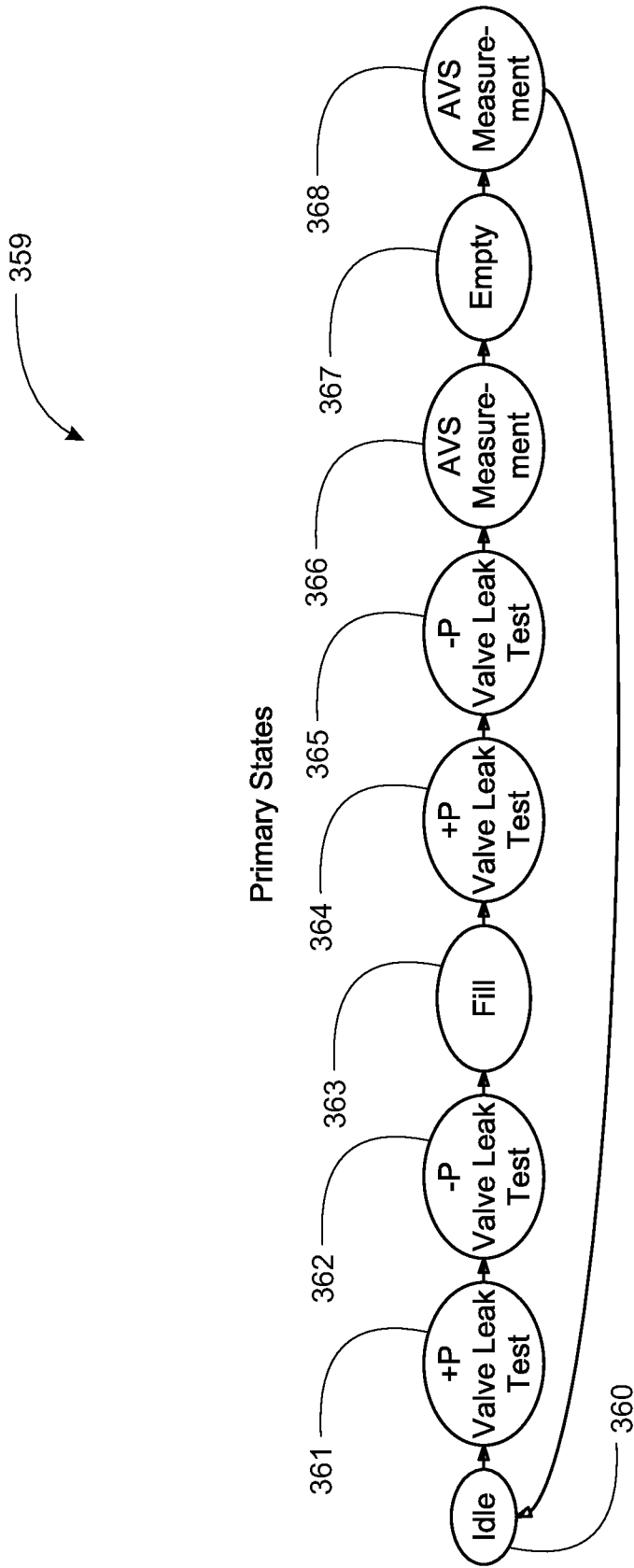


Fig. 84

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358

Pneumatic AVS Pump
Flow Controlled Pumping: Idle State

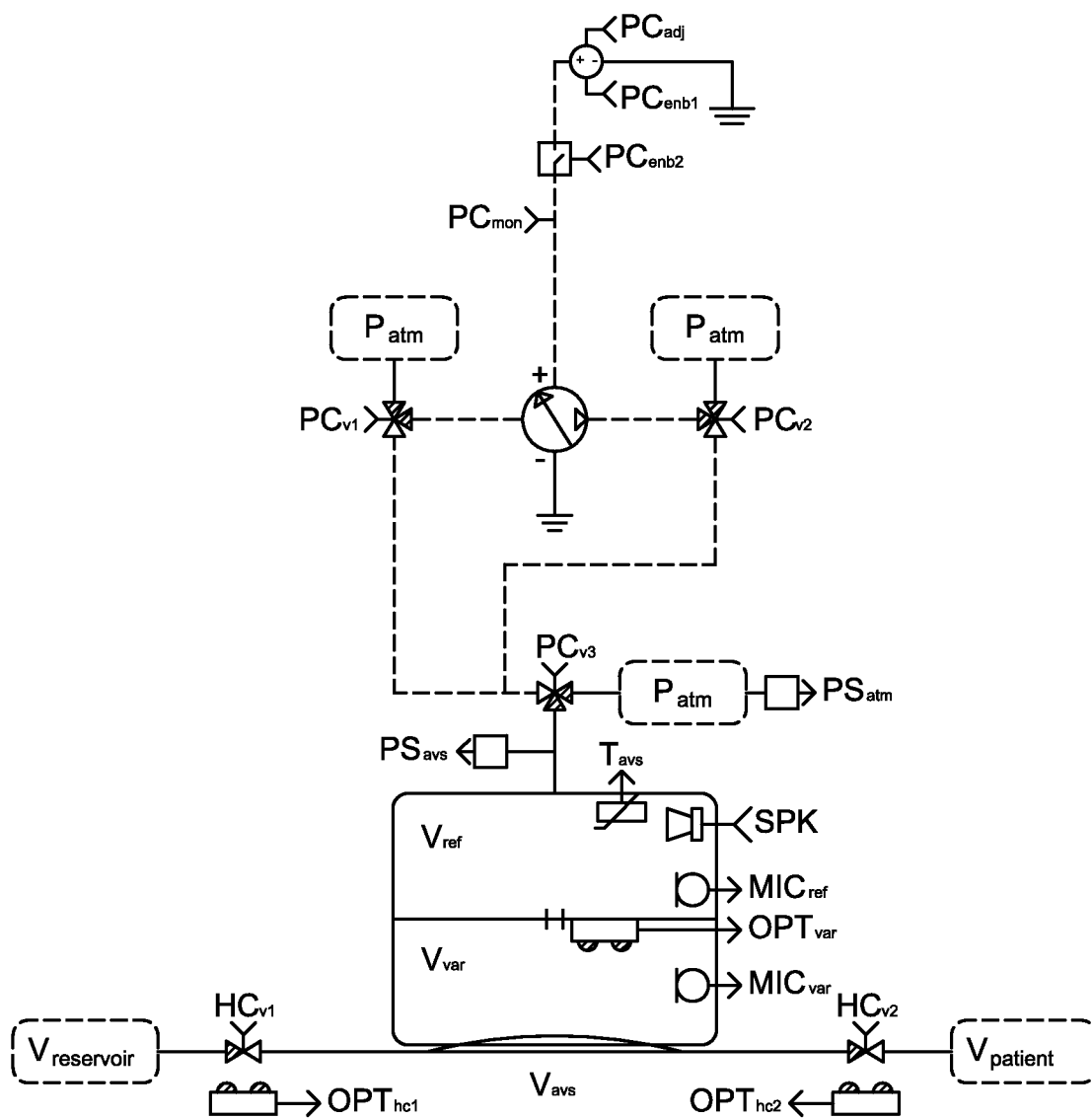


Fig. 85

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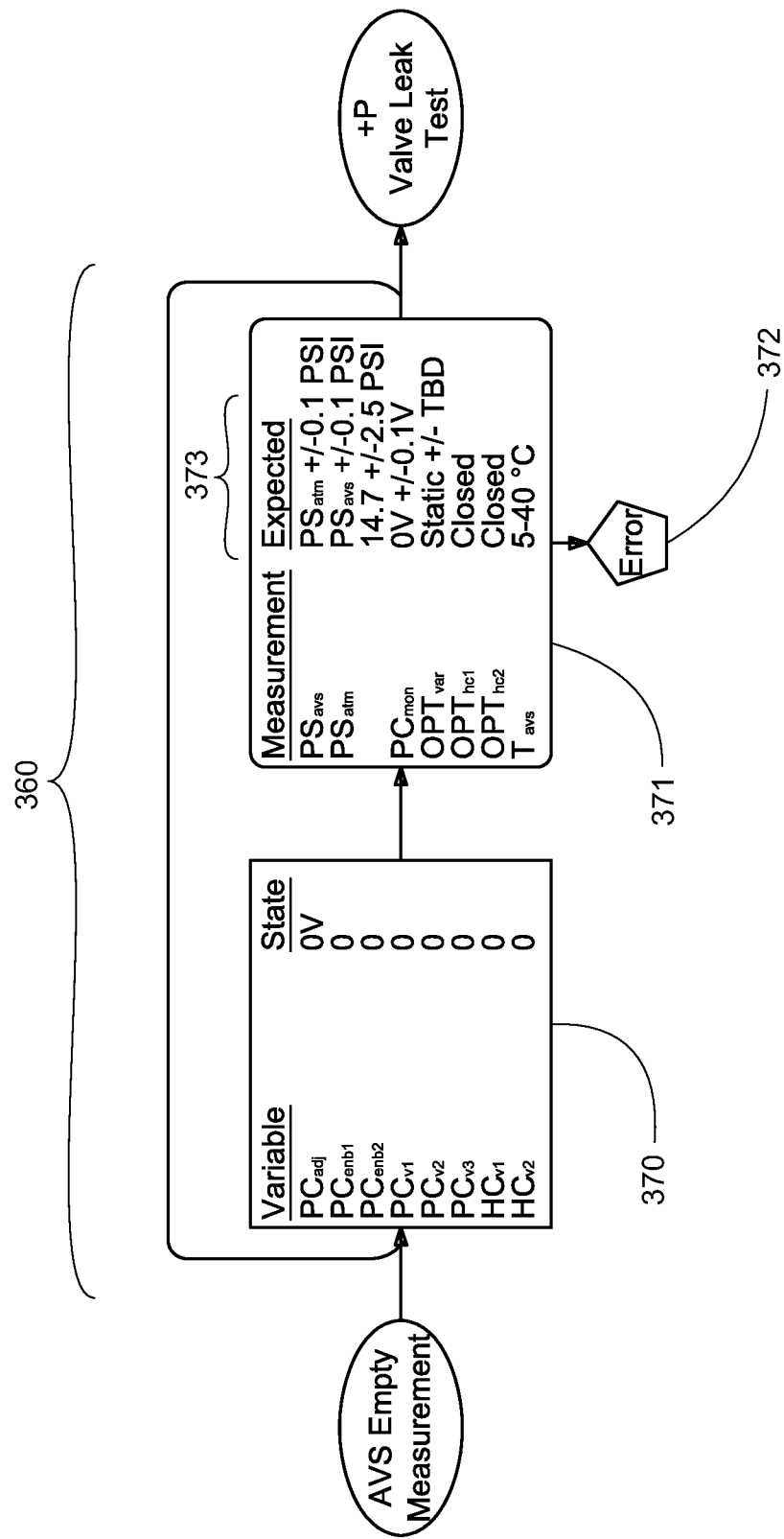


Fig. 86

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357 ————— 358

Pneumatic AVS Pump

Flow Controlled Pumping: Positive Pressure Valve Leak

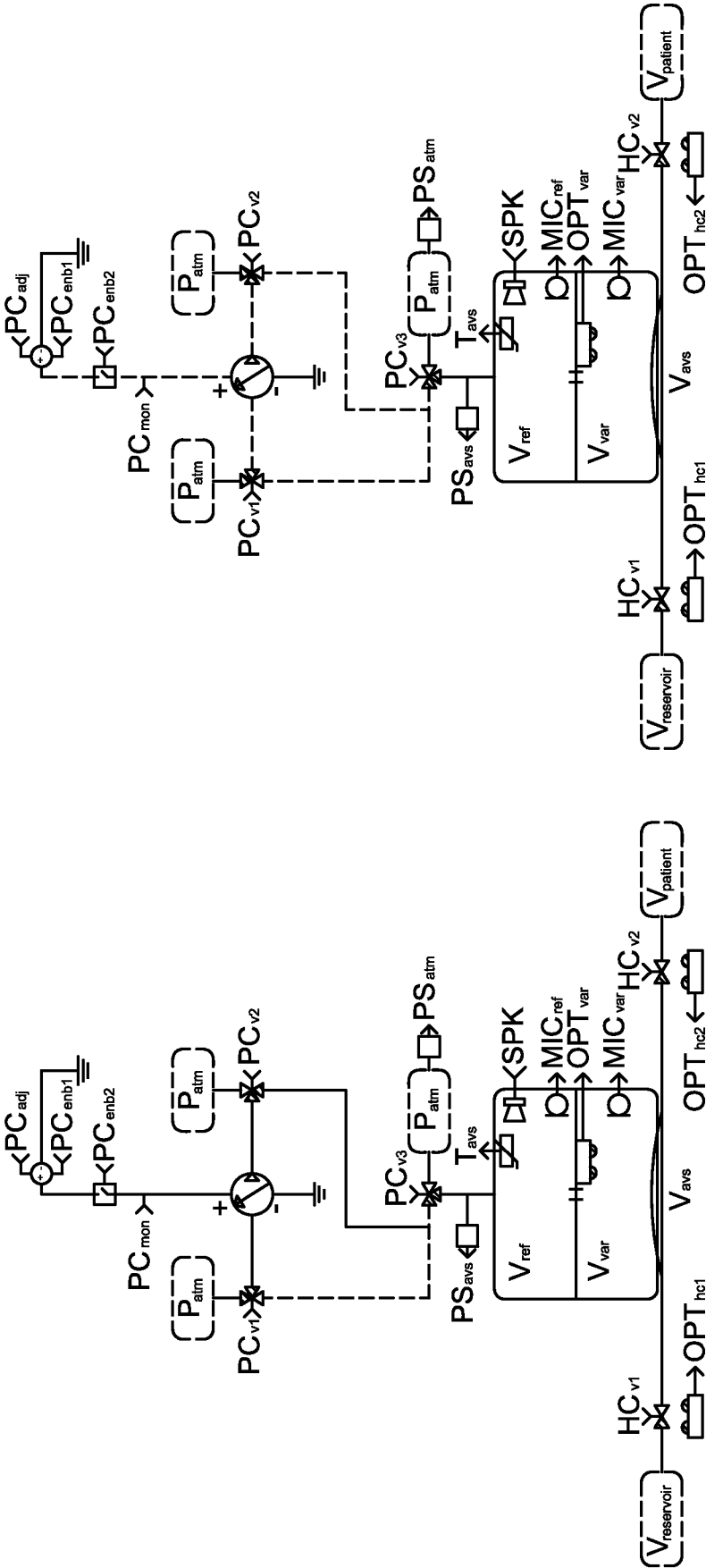


Fig. 87

Fig. 88

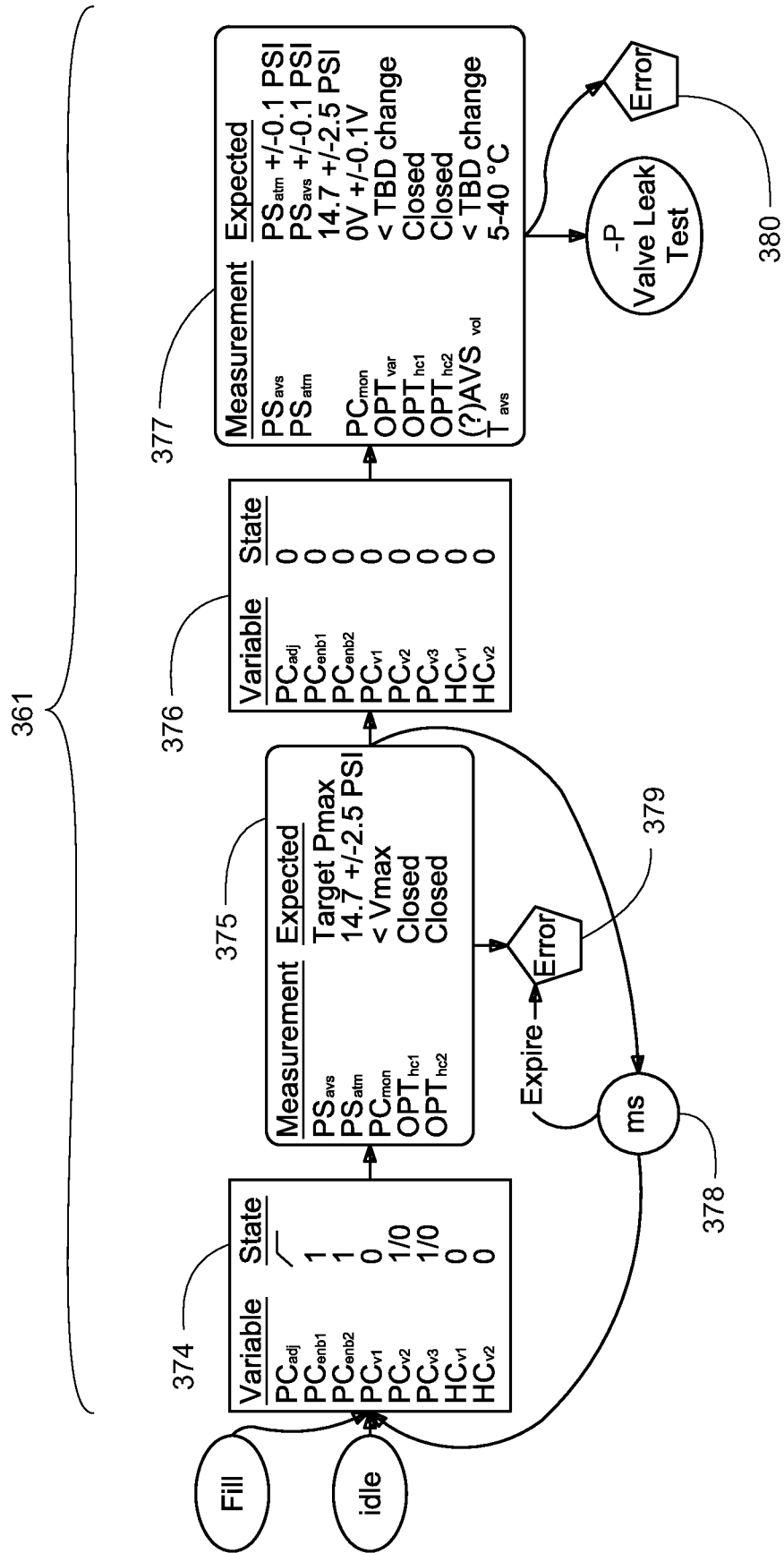


Fig. 89

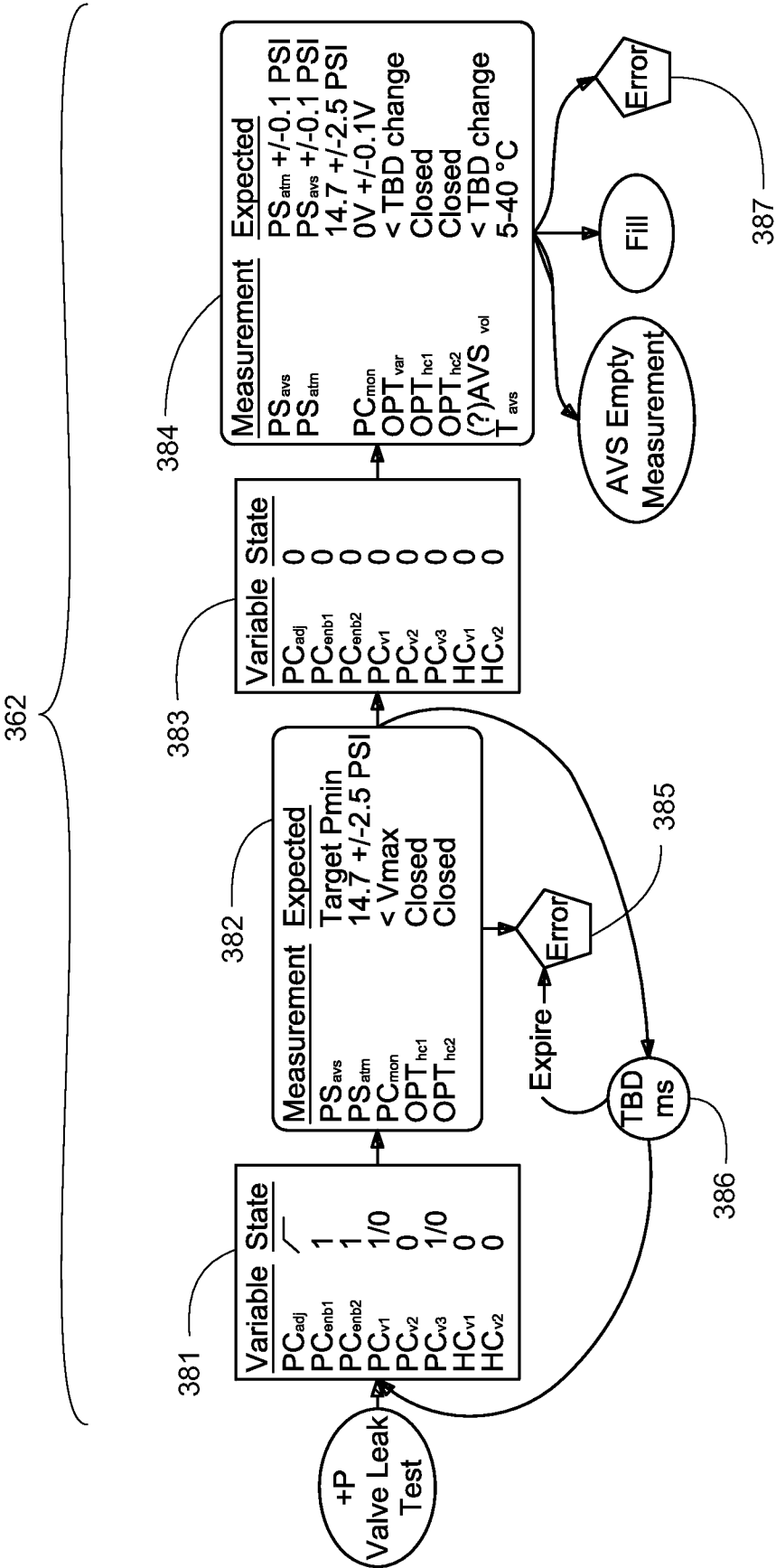


Fig. 92

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Pneumatic AVS Pump
Flow Controlled Pumping: Fill

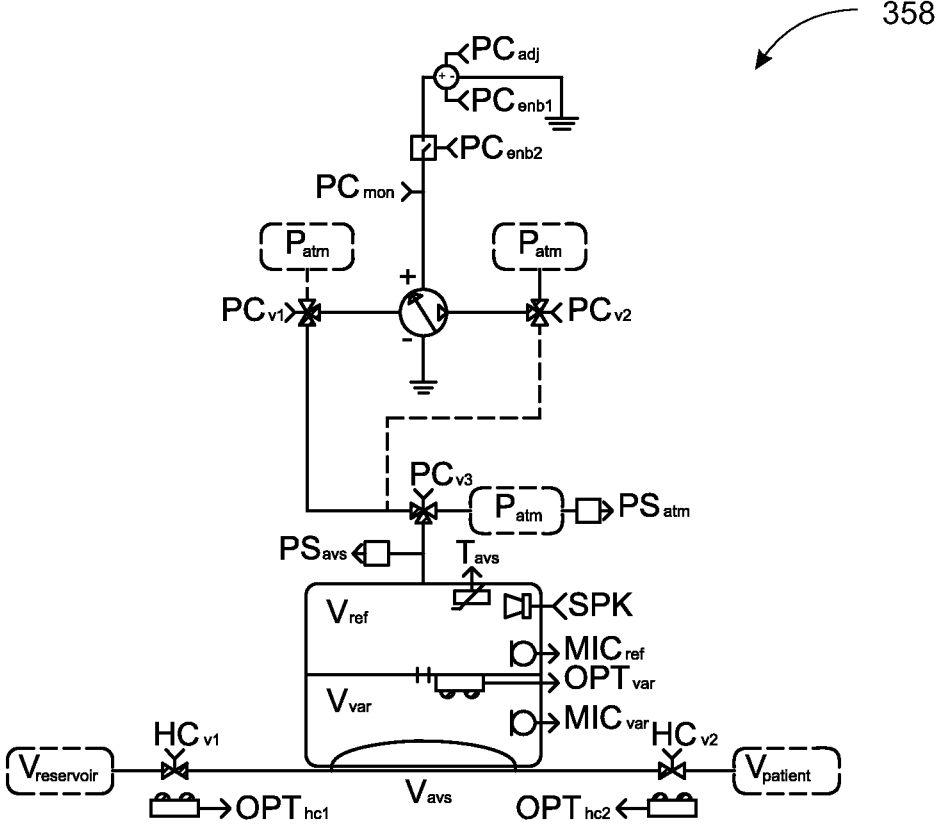


Fig. 93

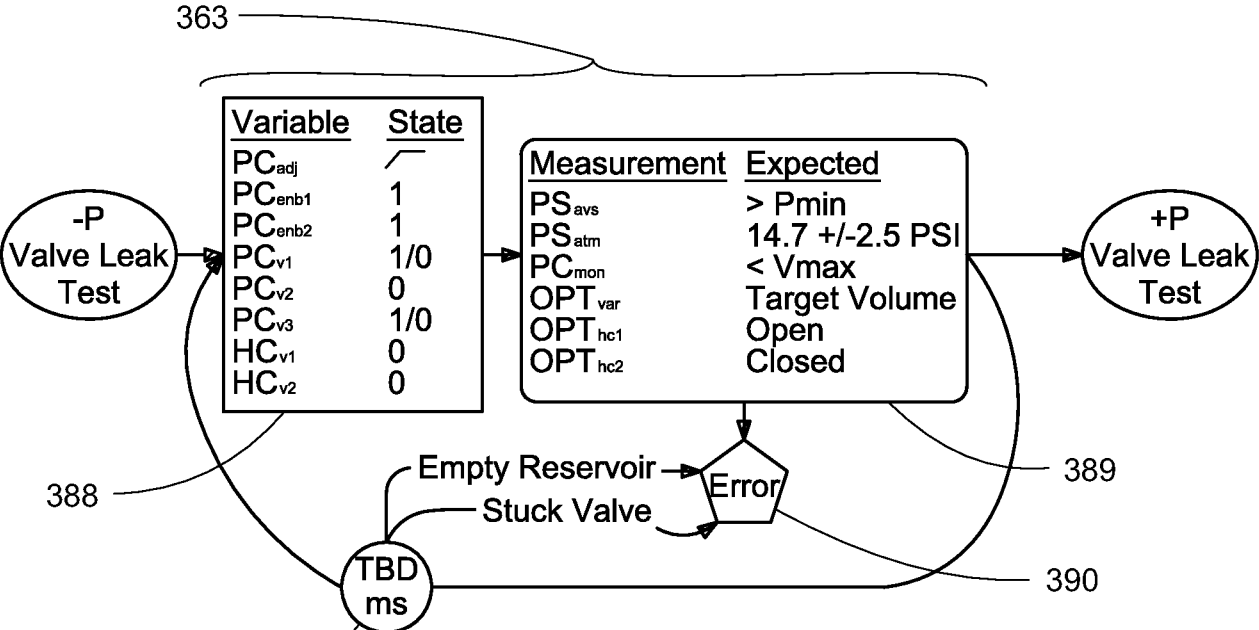
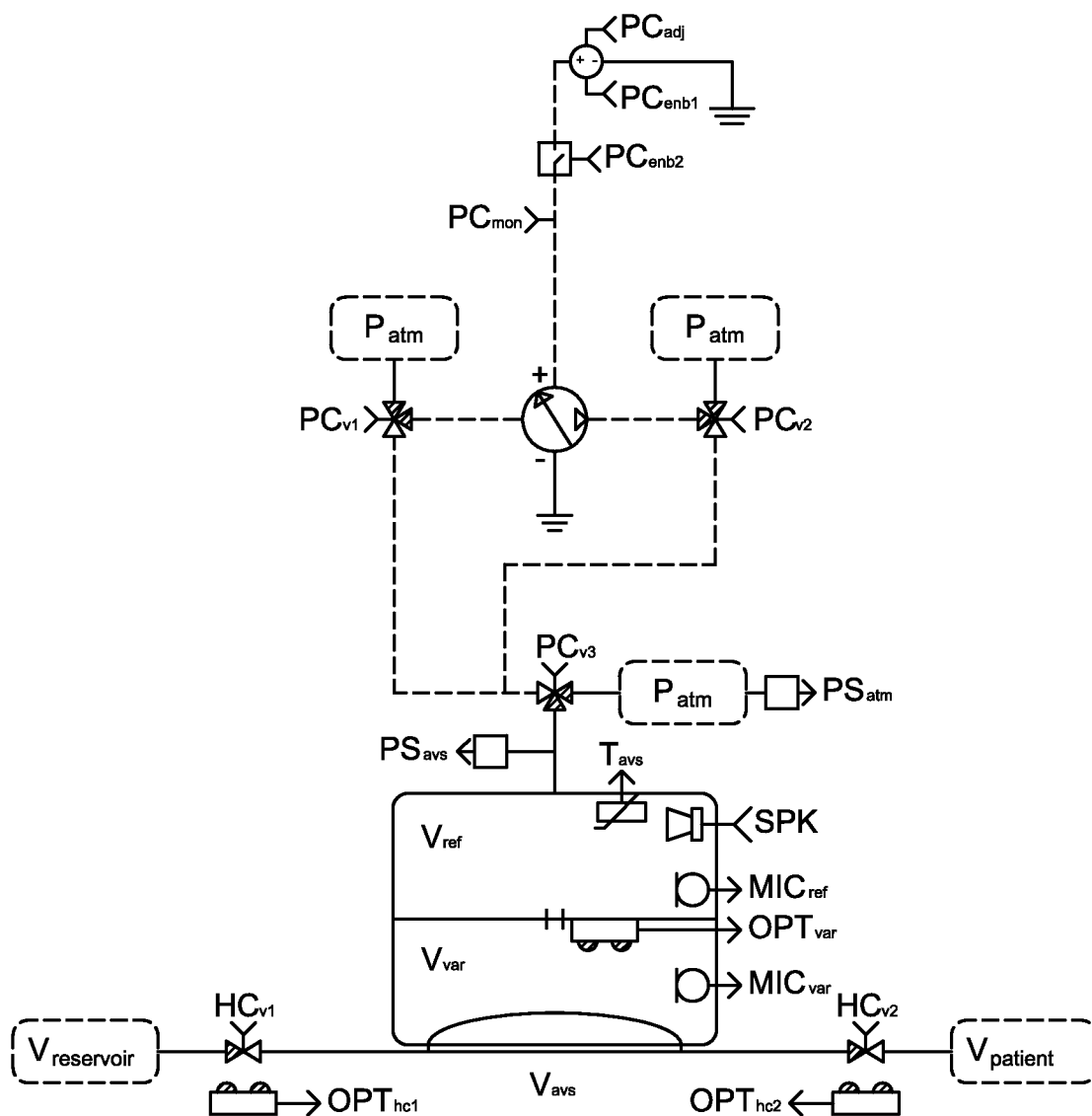


Fig. 94

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Pneumatic AVS Pump

Flow Controlled Pumping: AVS Measurement



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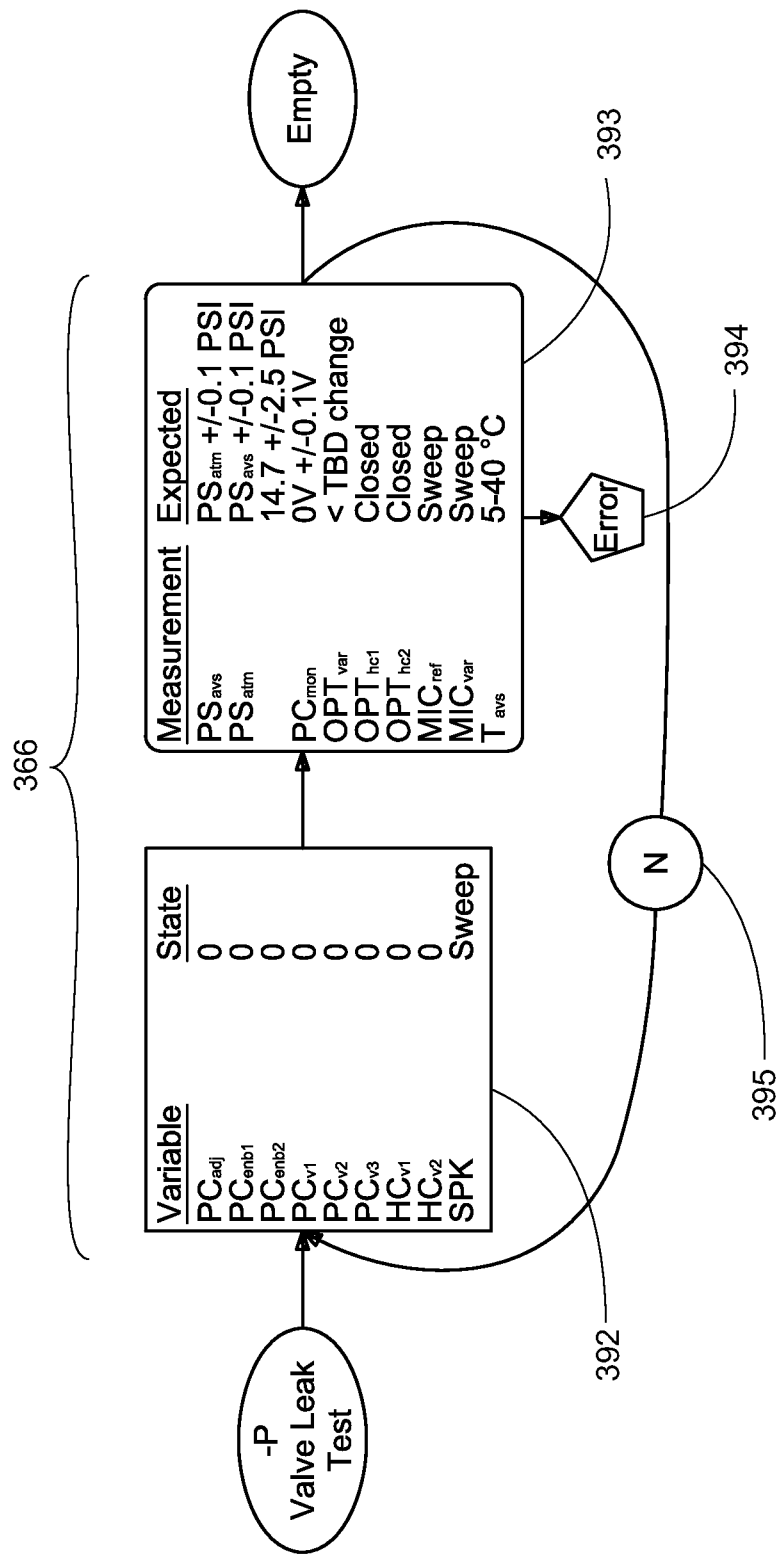


Fig. 96

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Pneumatic AVS Pump
Flow Controlled Pumping: Empty

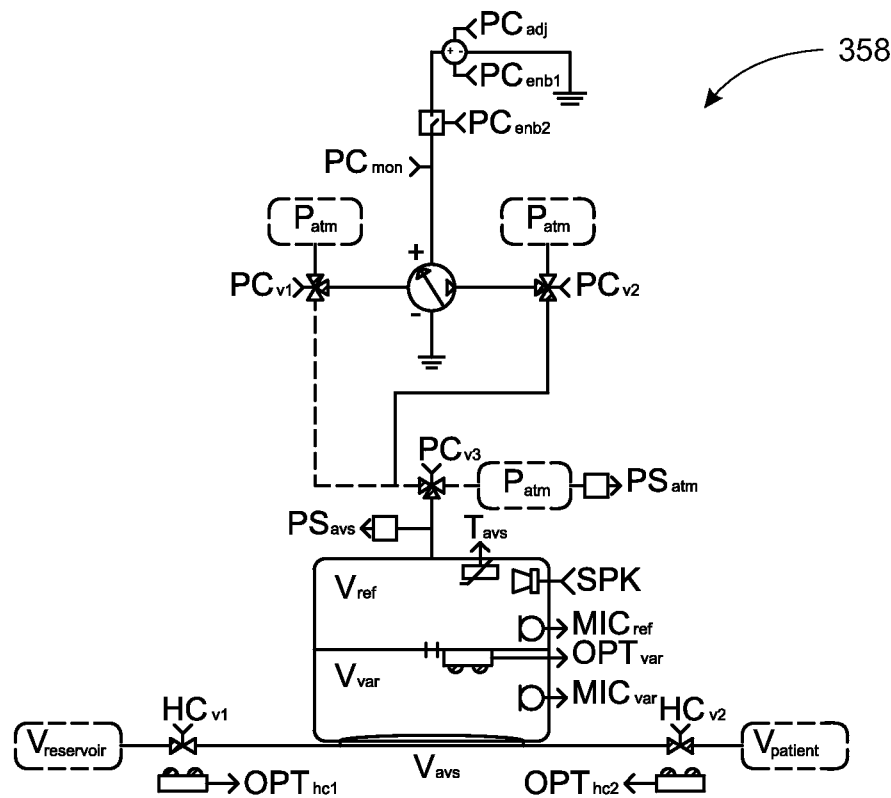
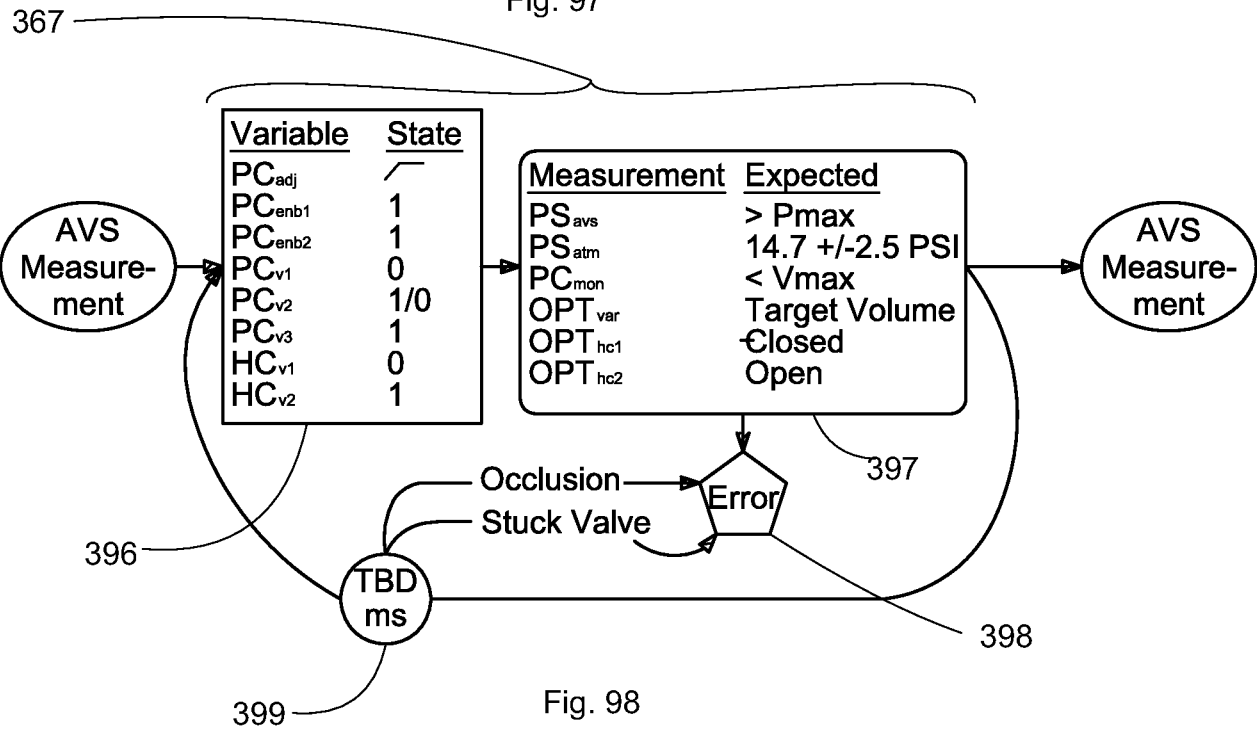


Fig. 97



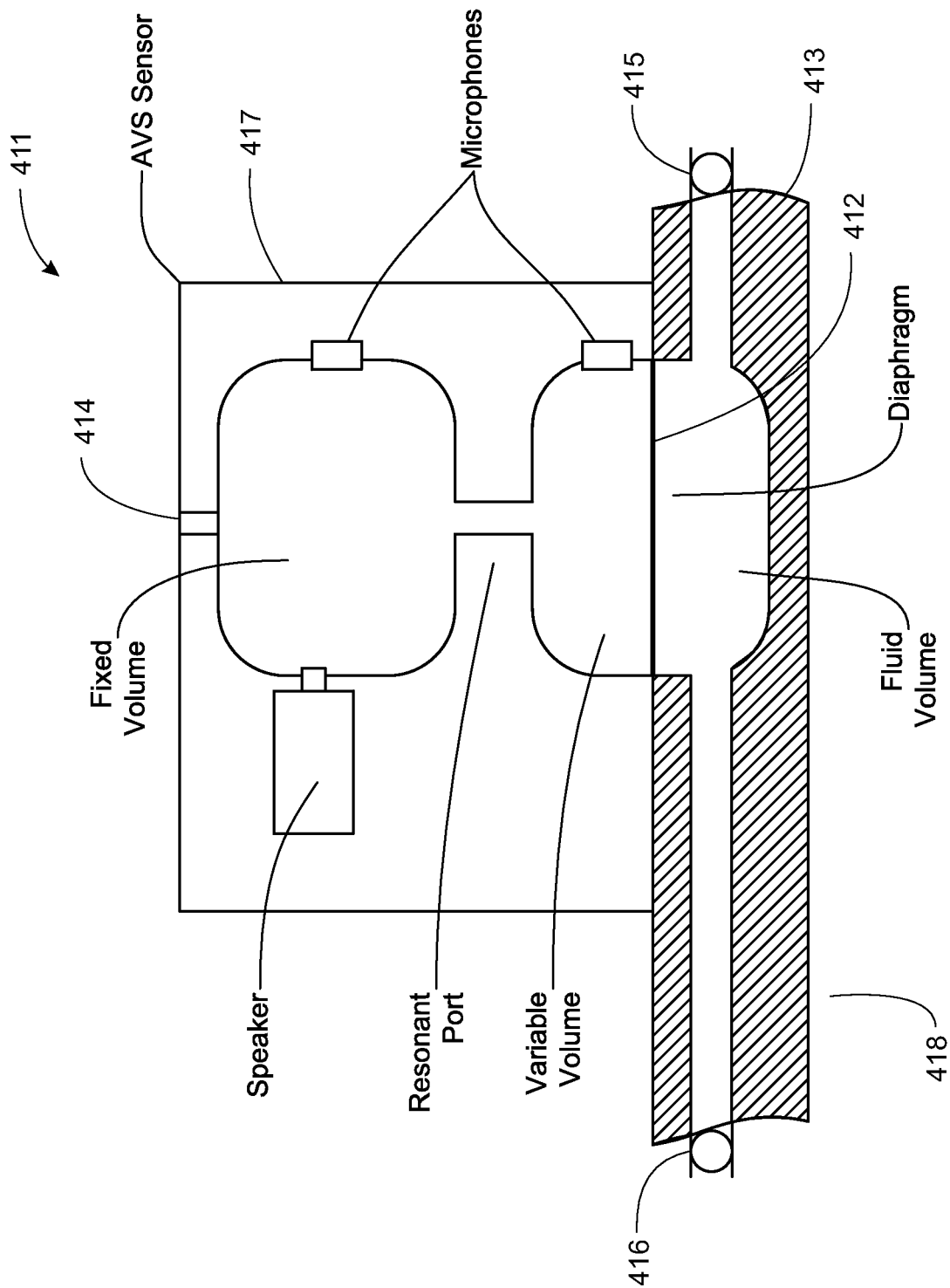


Fig. 99

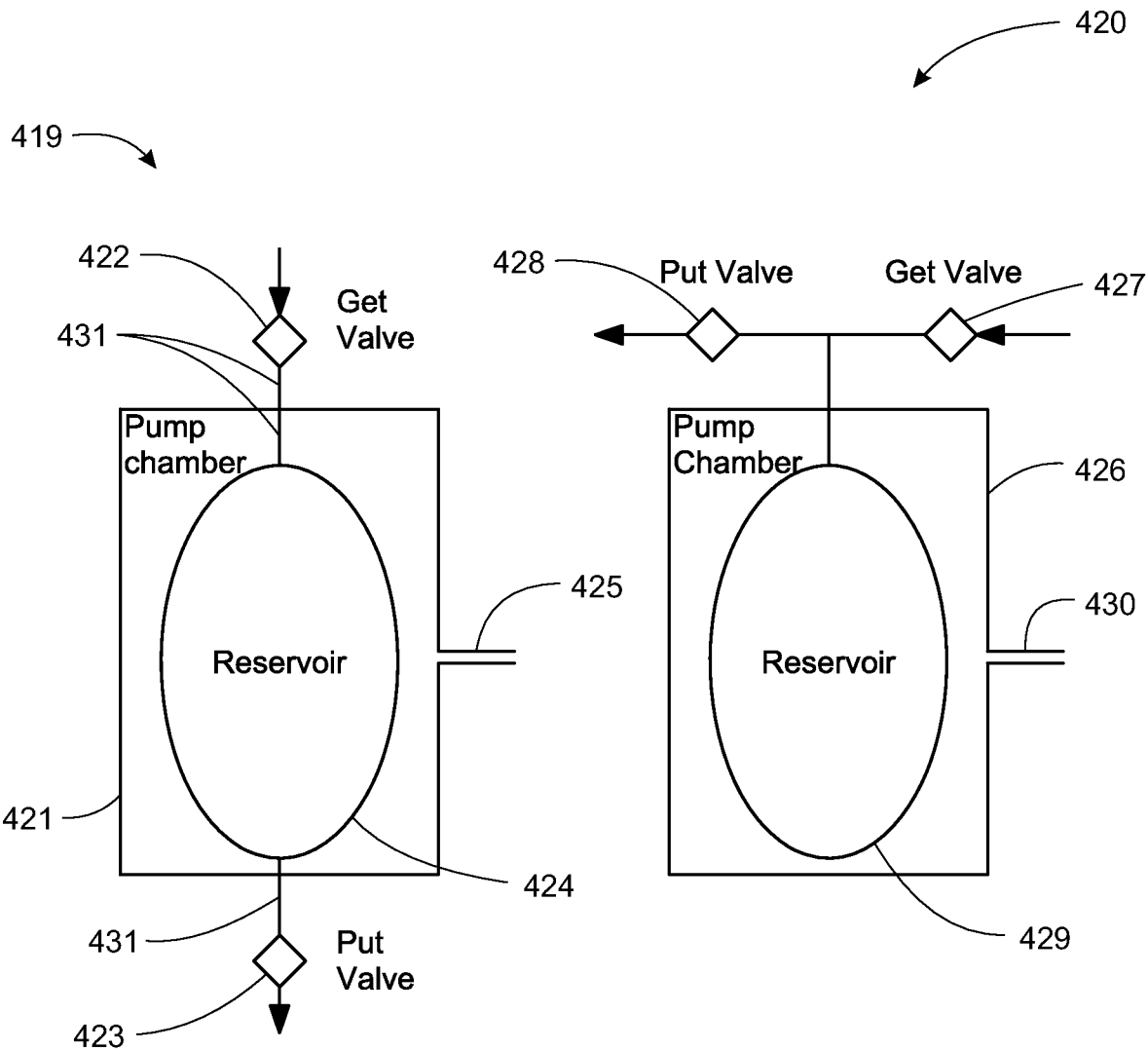


Fig. 100

Fig. 101

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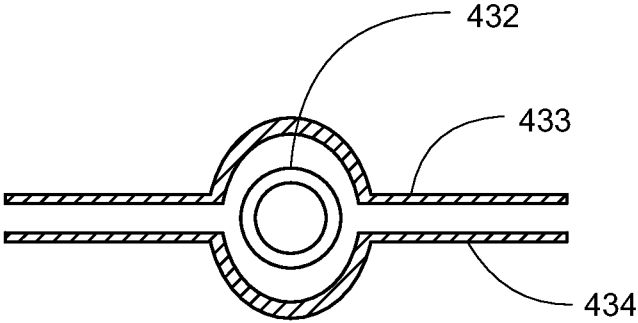


Fig. 102

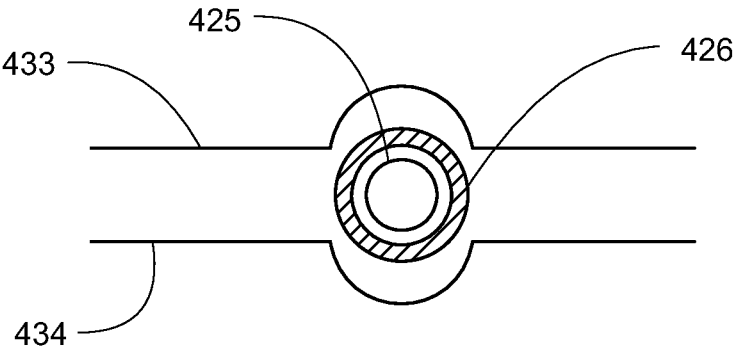


Fig. 103

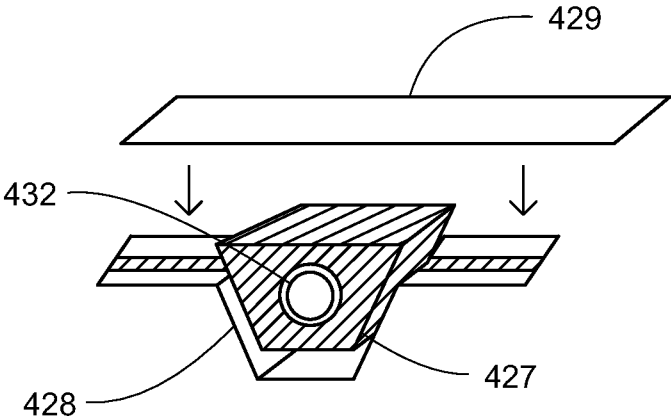


Fig. 104

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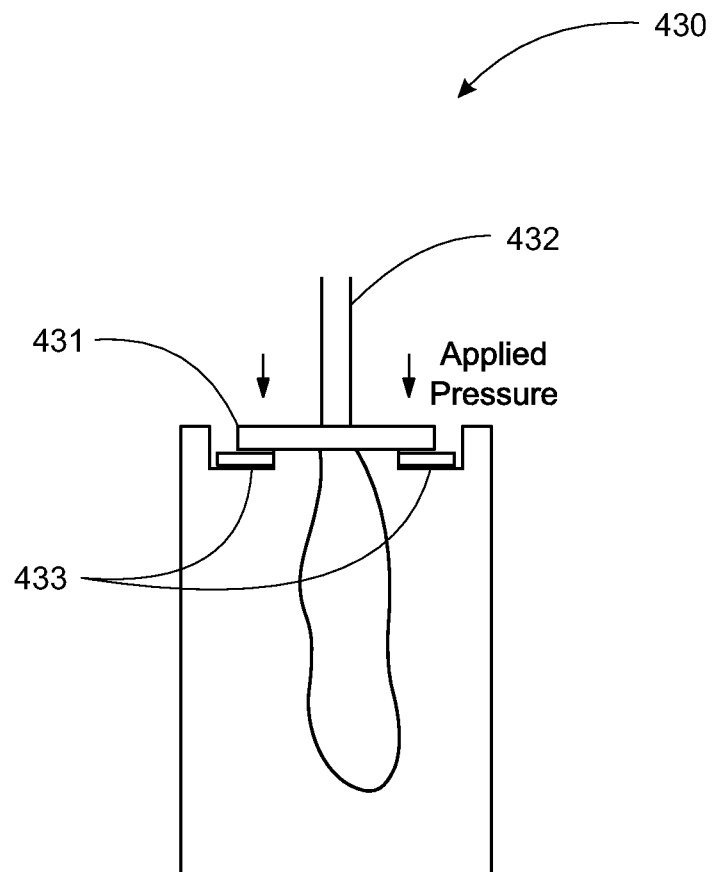


Fig. 105

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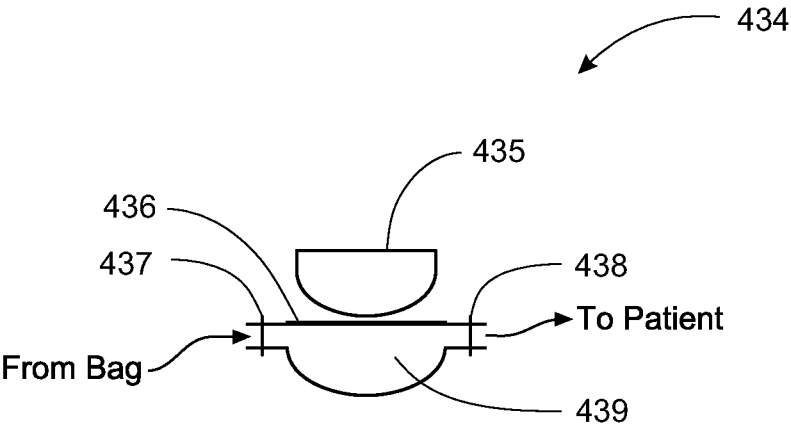


Fig. 106

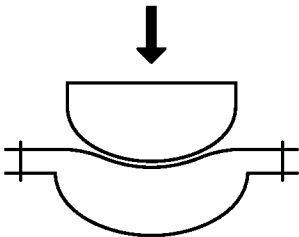


Fig. 107

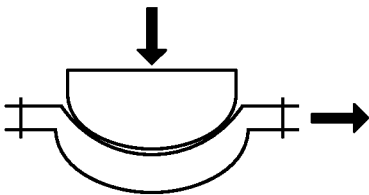


Fig. 108



Fig. 109

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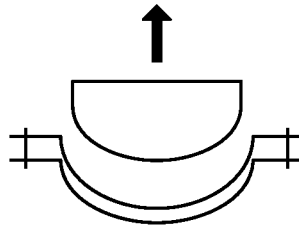


Fig. 110

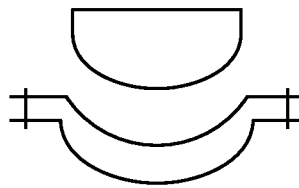


Fig. 111

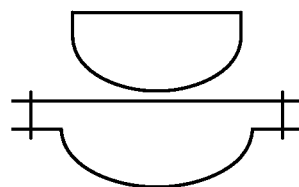
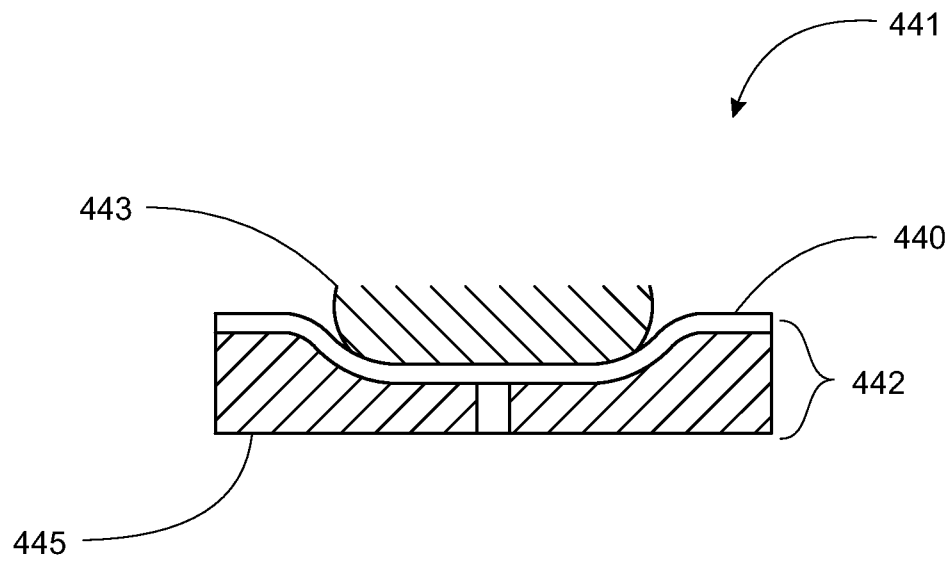


Fig. 112

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Fig. 114



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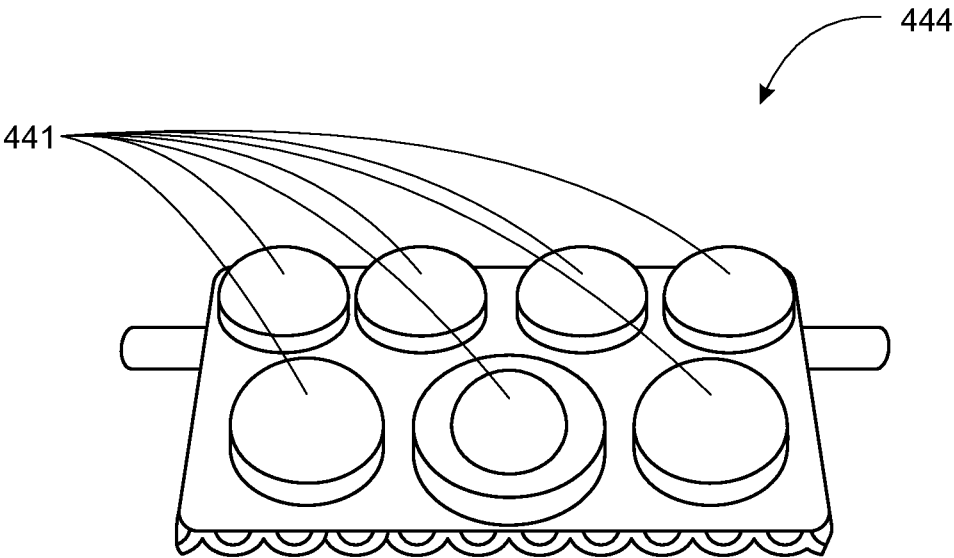


Fig. 115

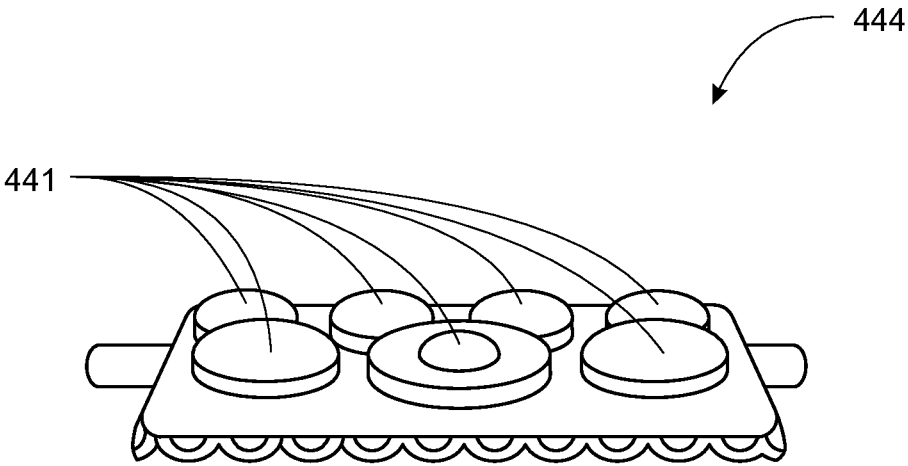


Fig. 116

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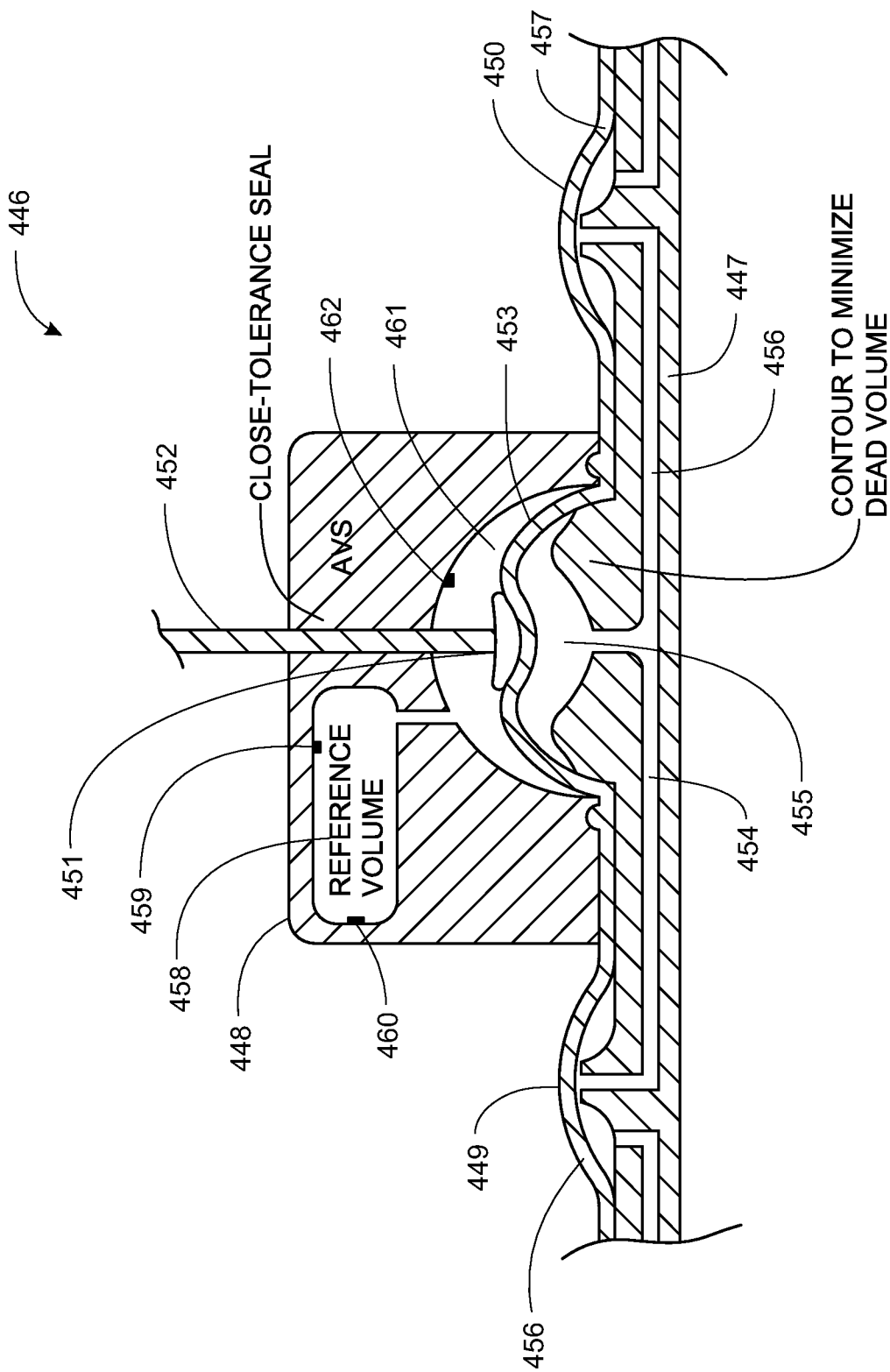


Fig. 117

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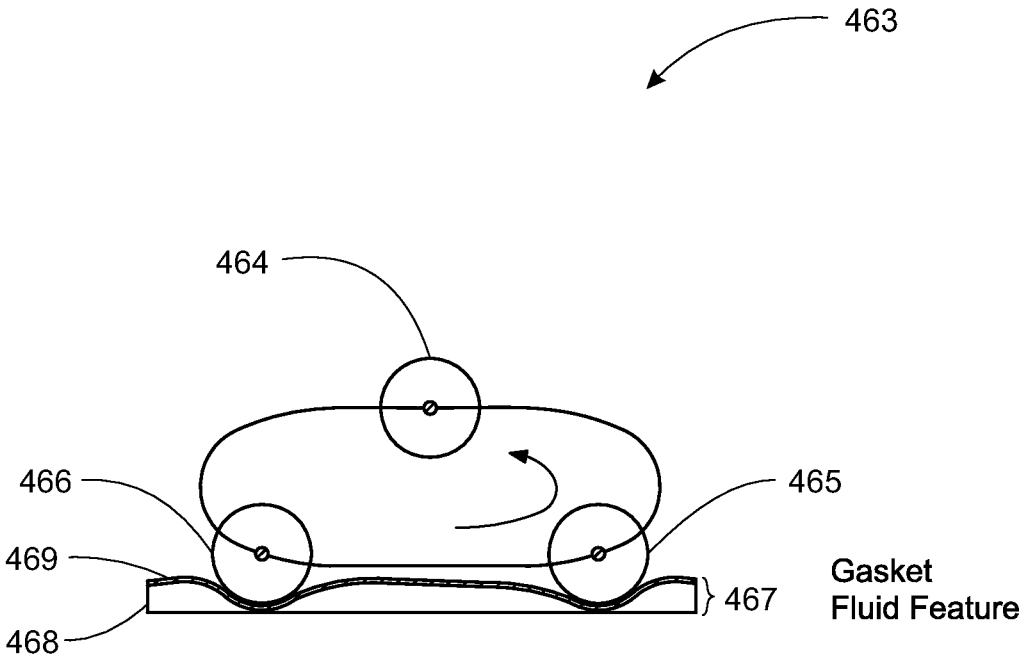


Fig. 118

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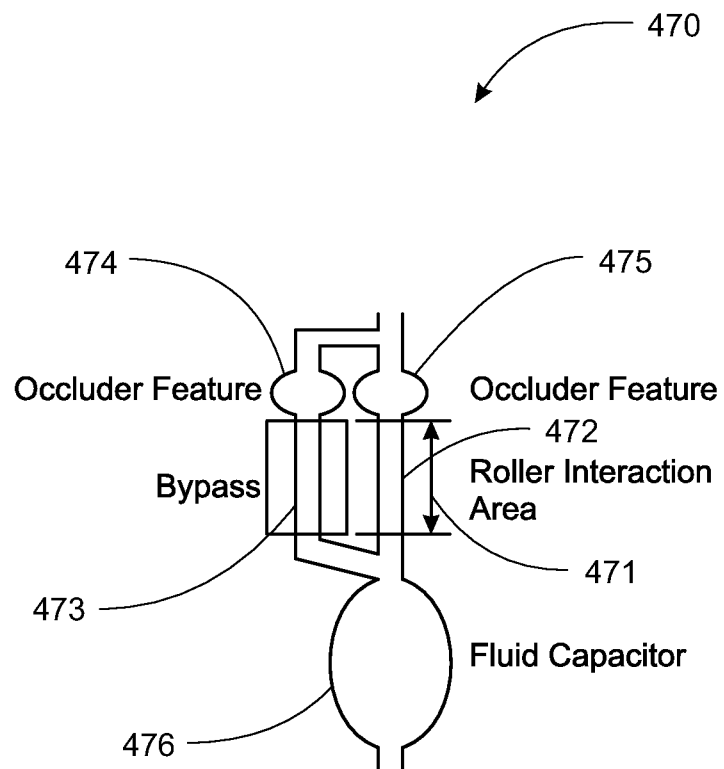


Fig. 119

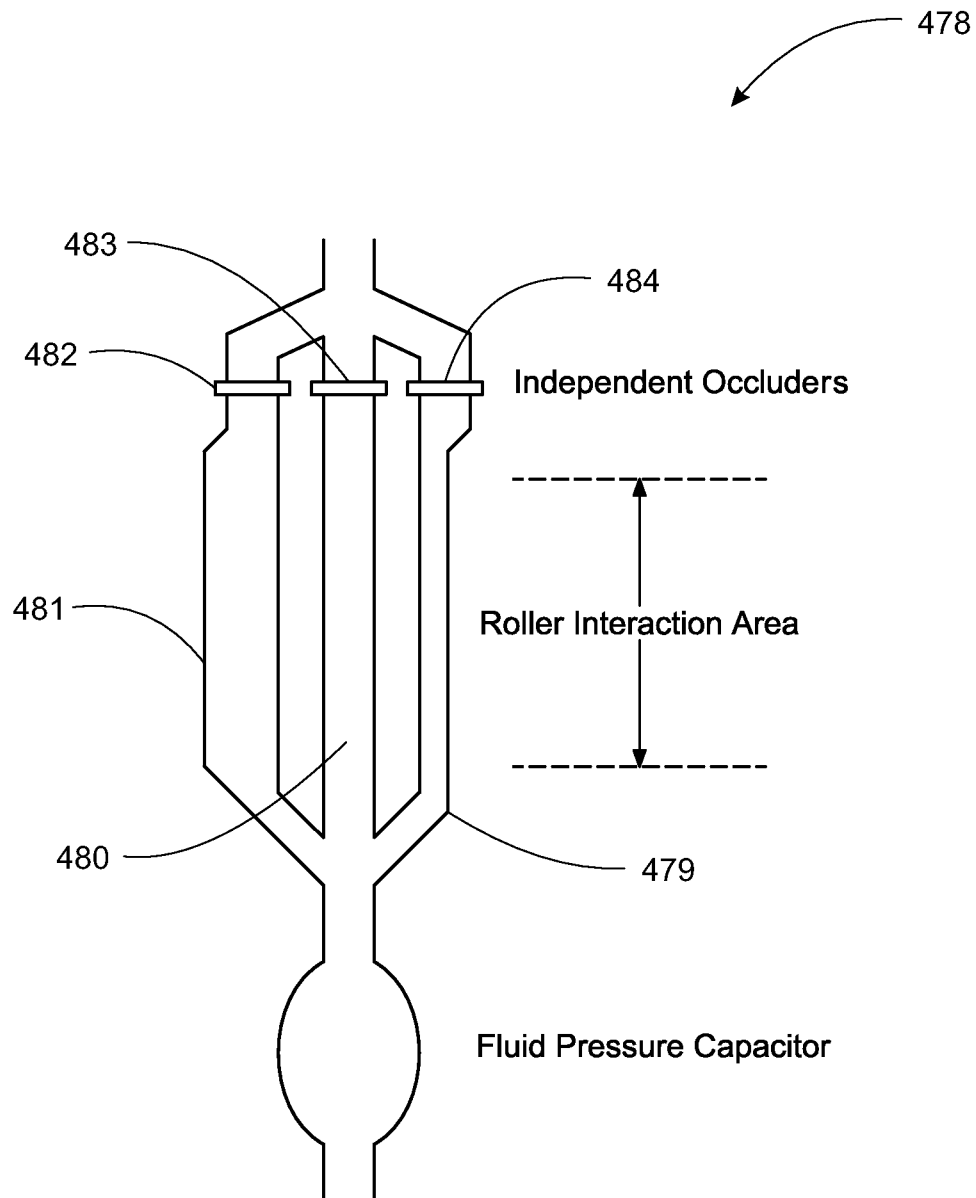


Fig. 120

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Figure 1: Rolling Occluder Drawback Method

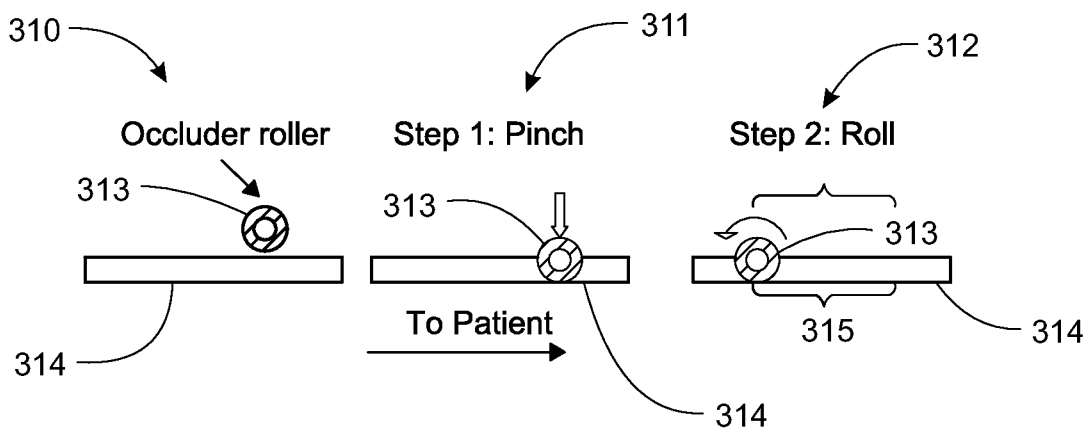


Fig. 121

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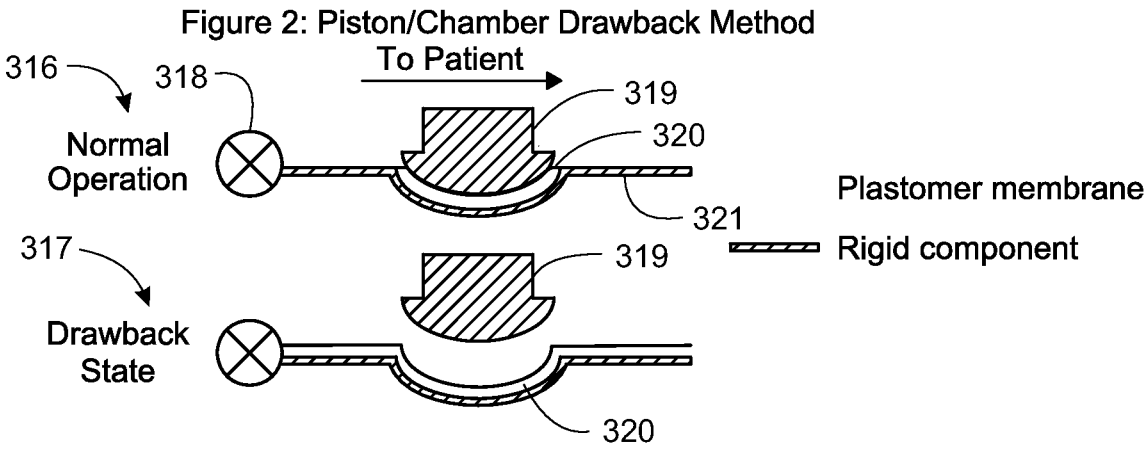


Fig. 122

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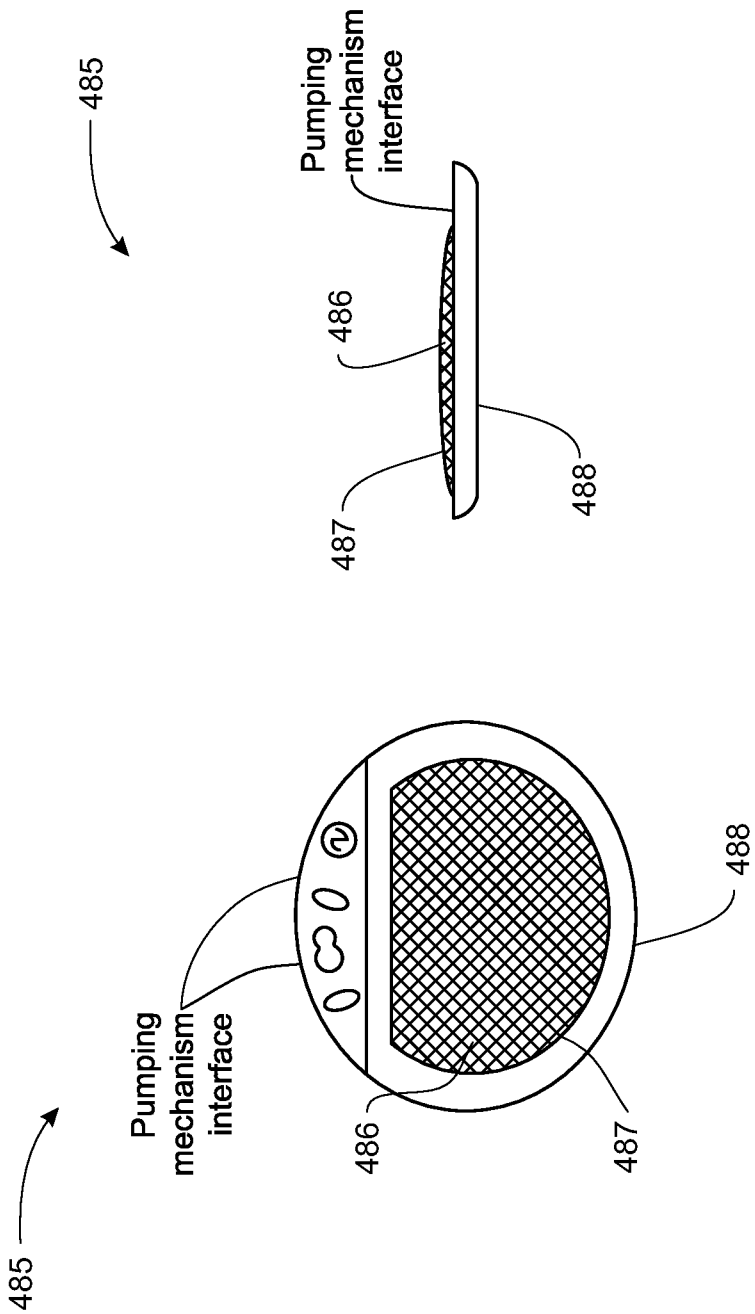


FIG. 123

FIG. 124

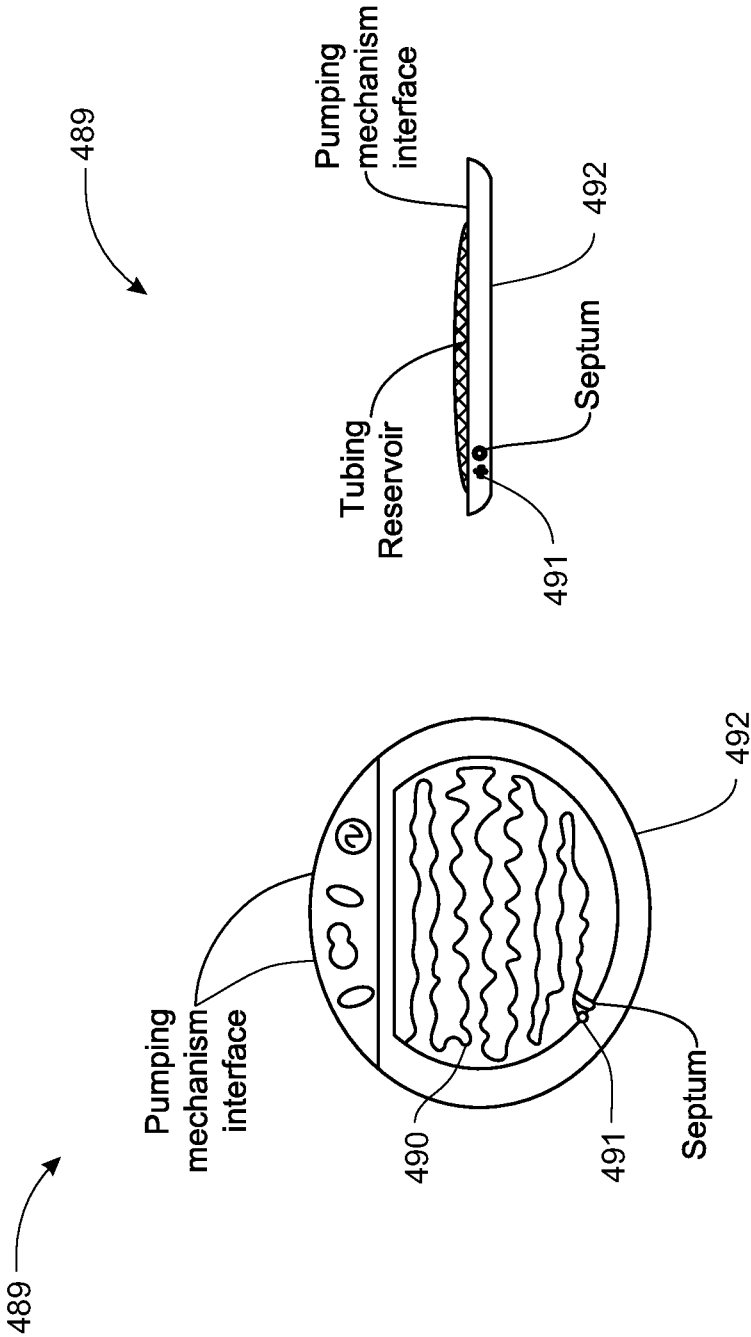


FIG. 125

FIG. 126

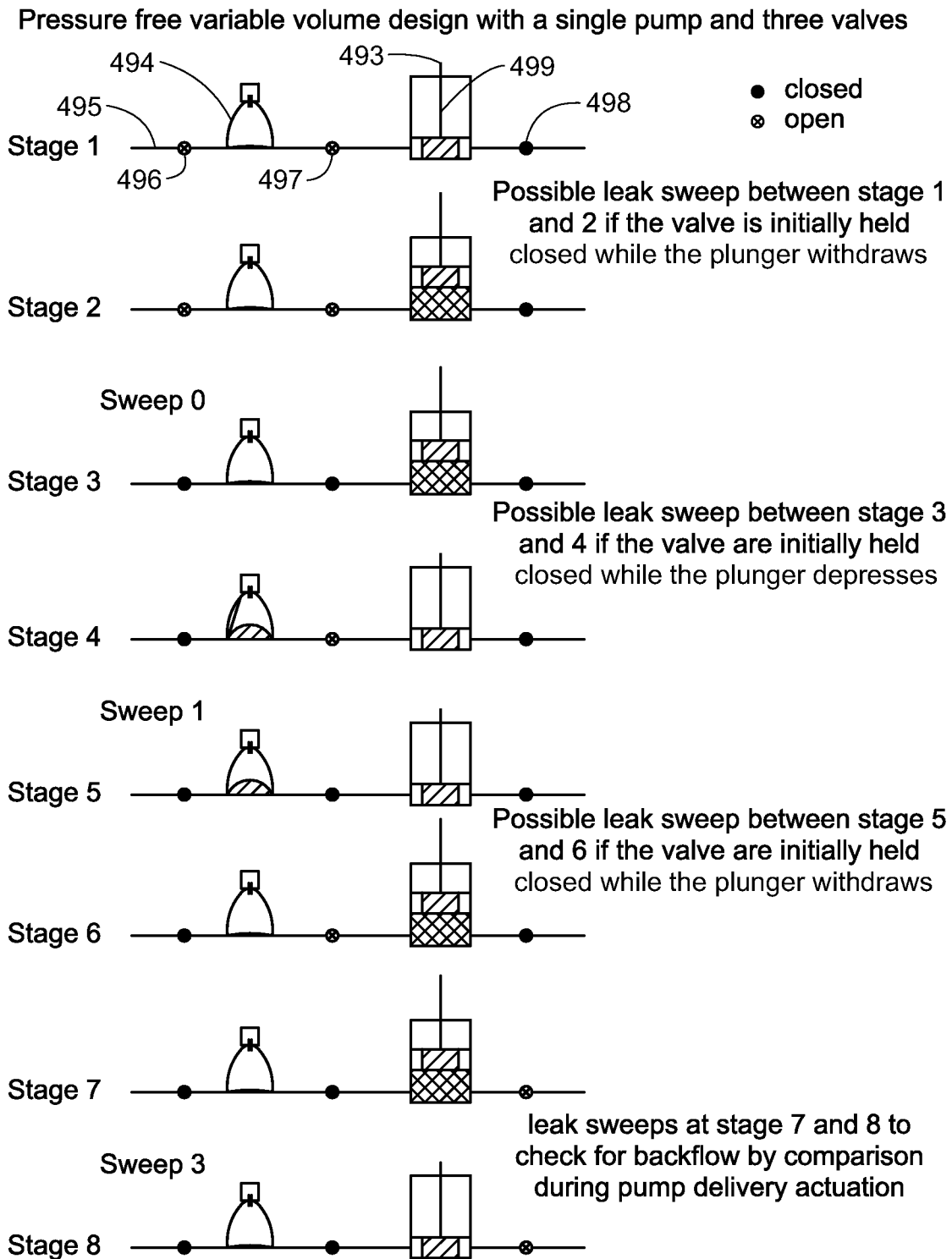


FIG. 127

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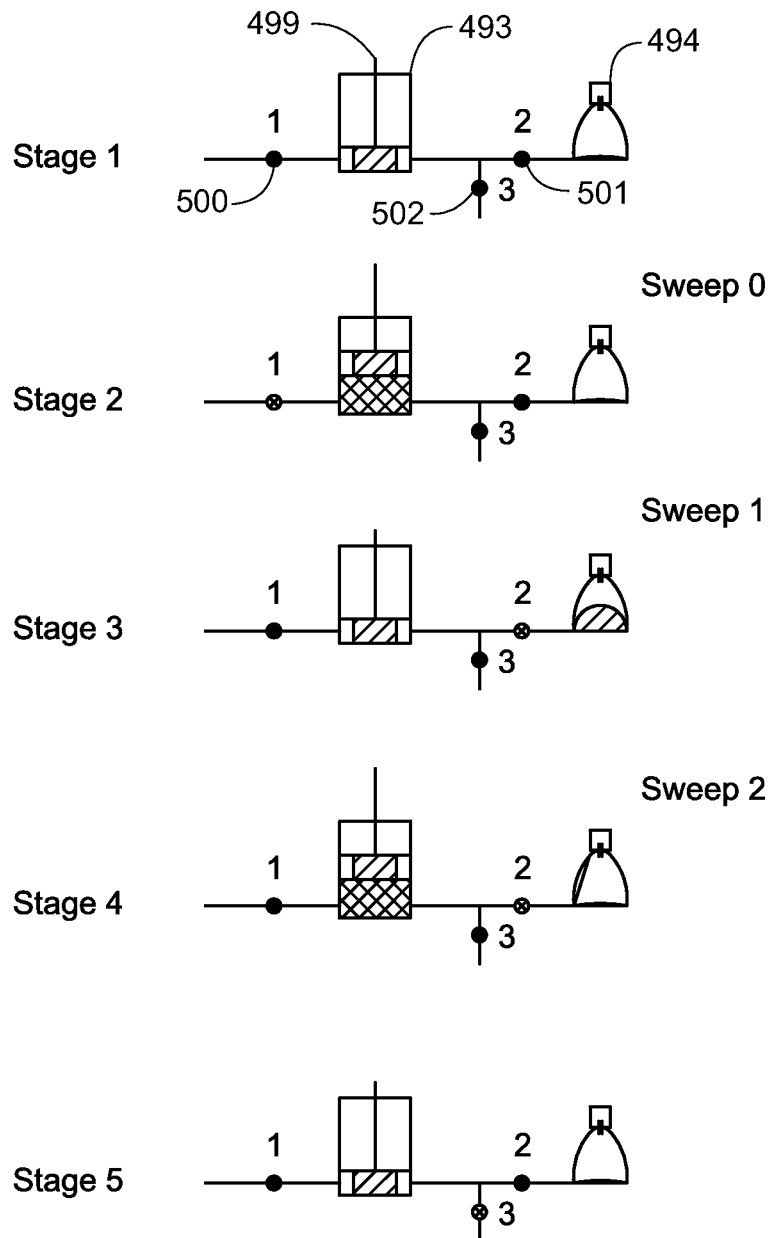


FIG. 128

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Actuator in pressure-free variable volume design with a single pump and two valves

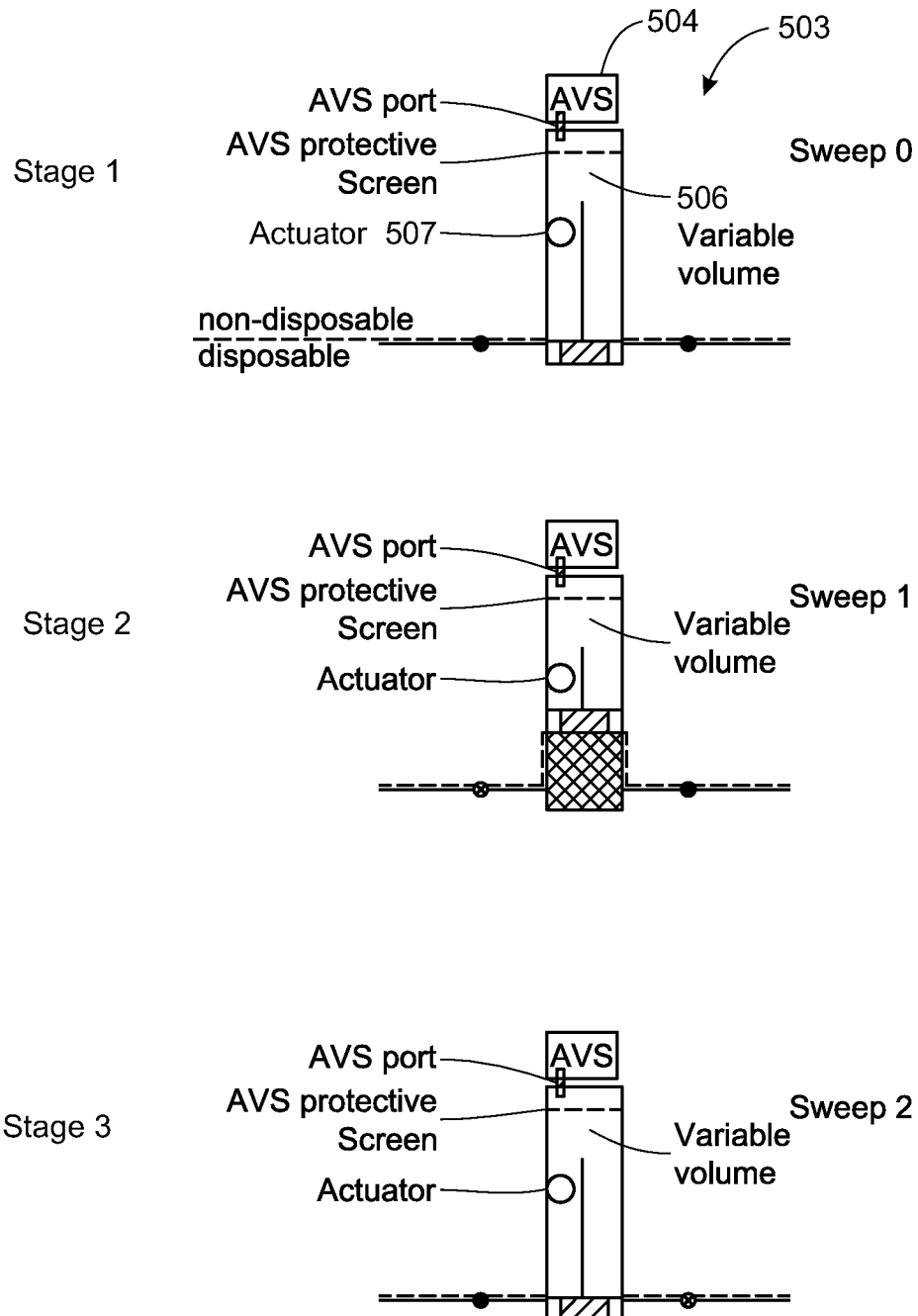


FIG. 129

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Cassette free pneumatically actuated AVS pump

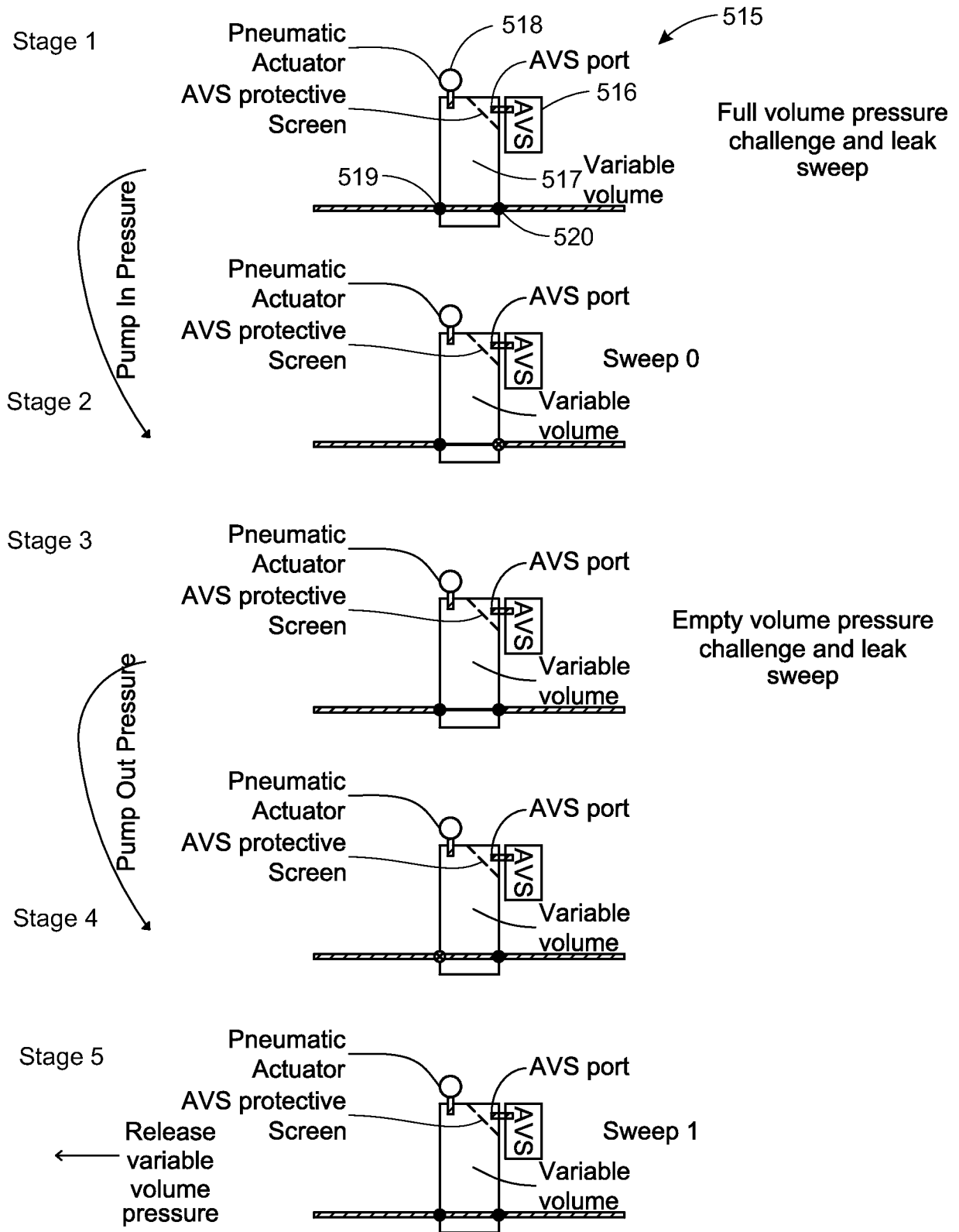


FIG. 131

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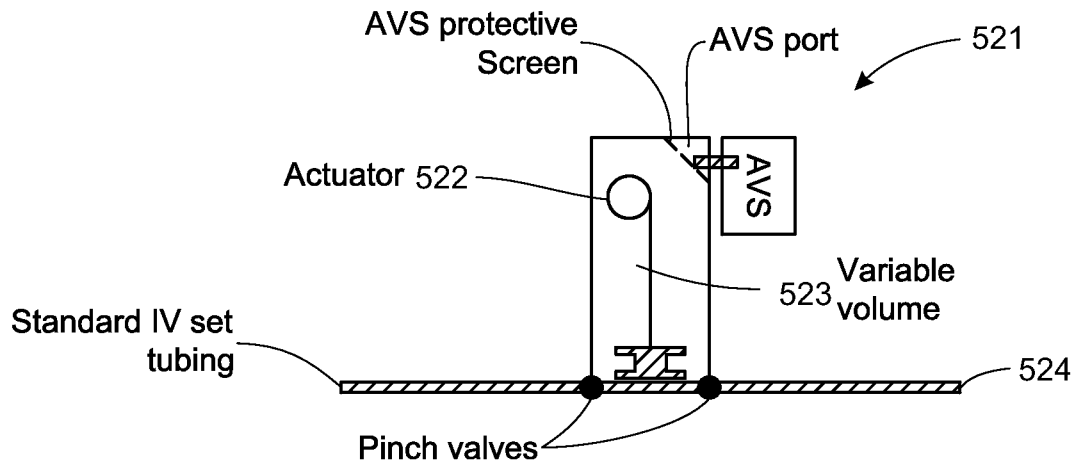


FIG. 132

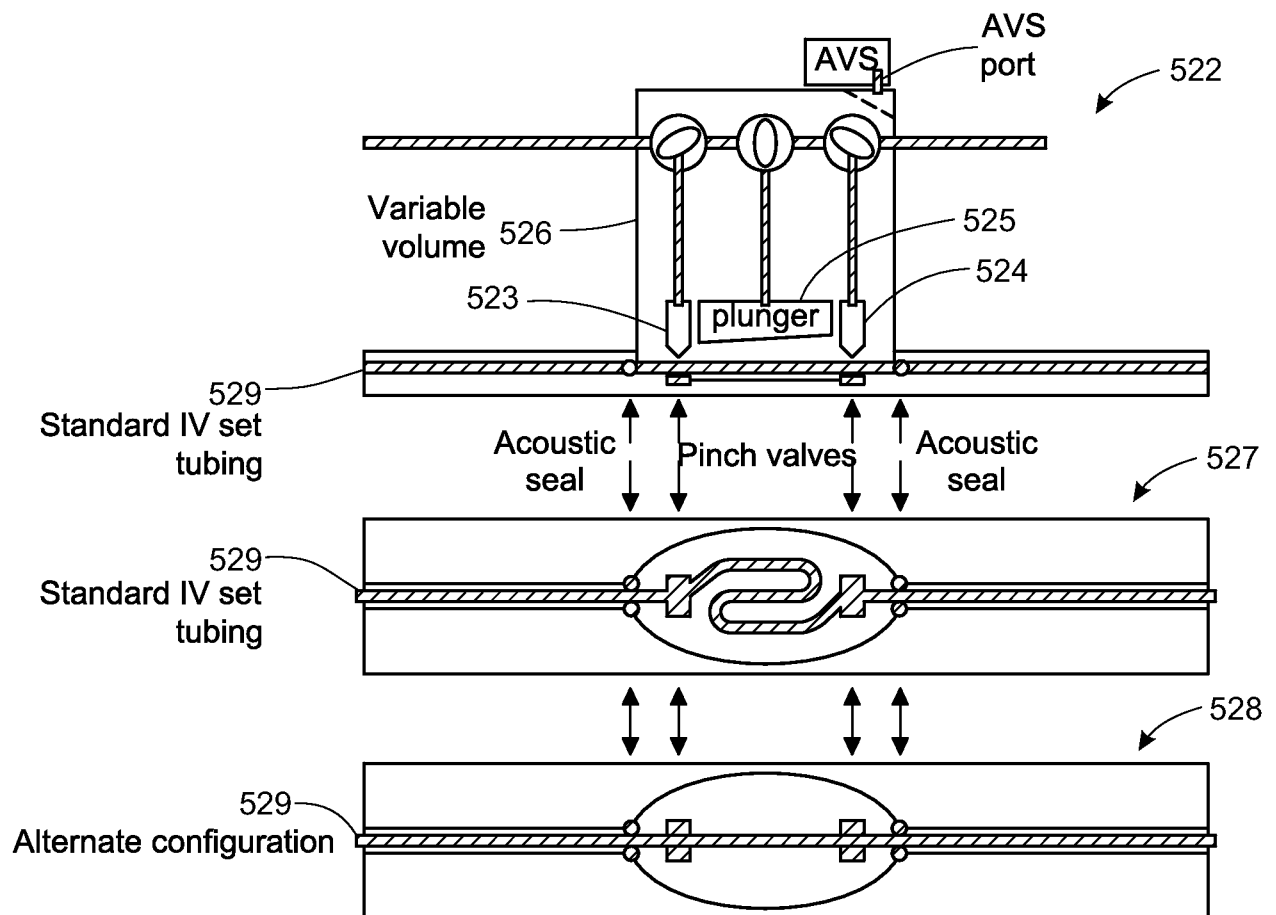


FIG. 133

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Mechanically actuated cassette free avs pumping design

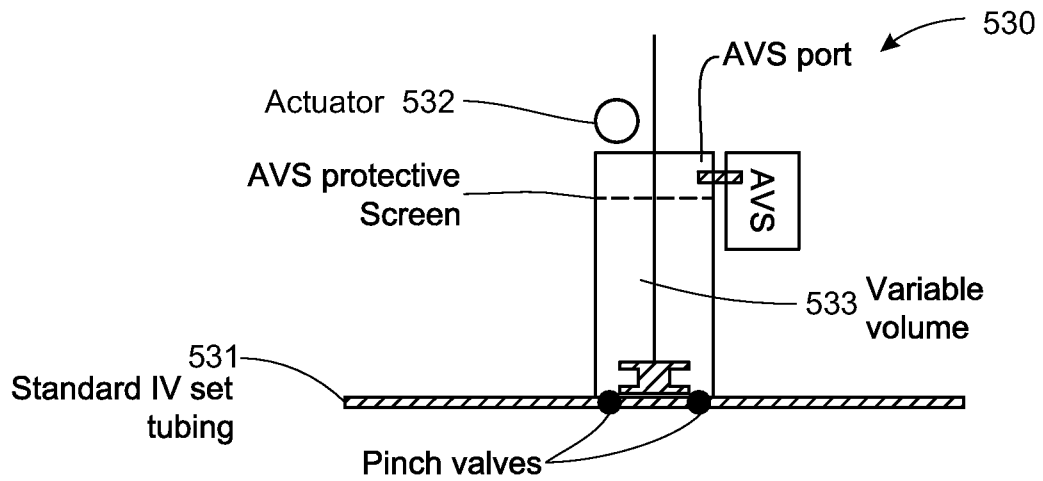


FIG. 134

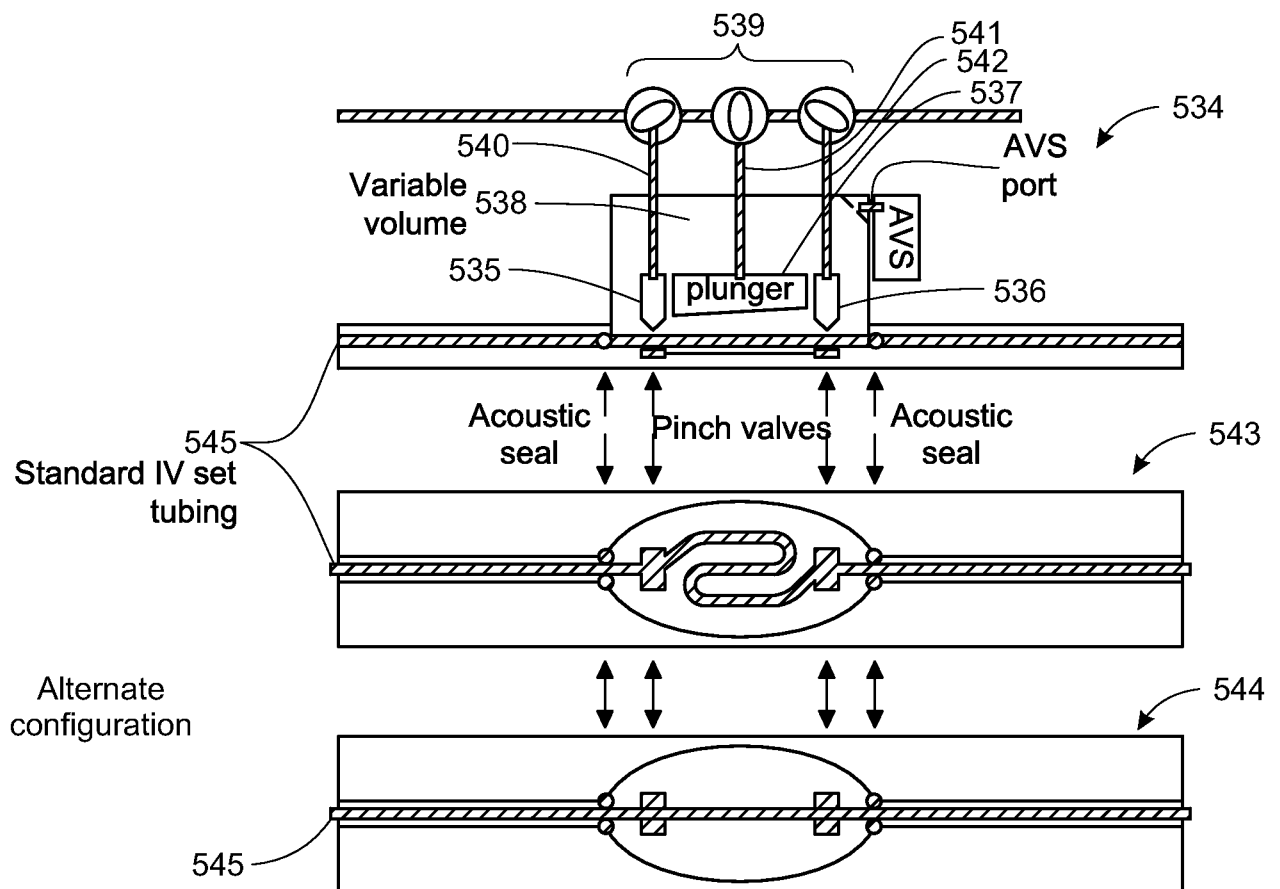


FIG. 135

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Mechanically actuated cassette free avs pumping design

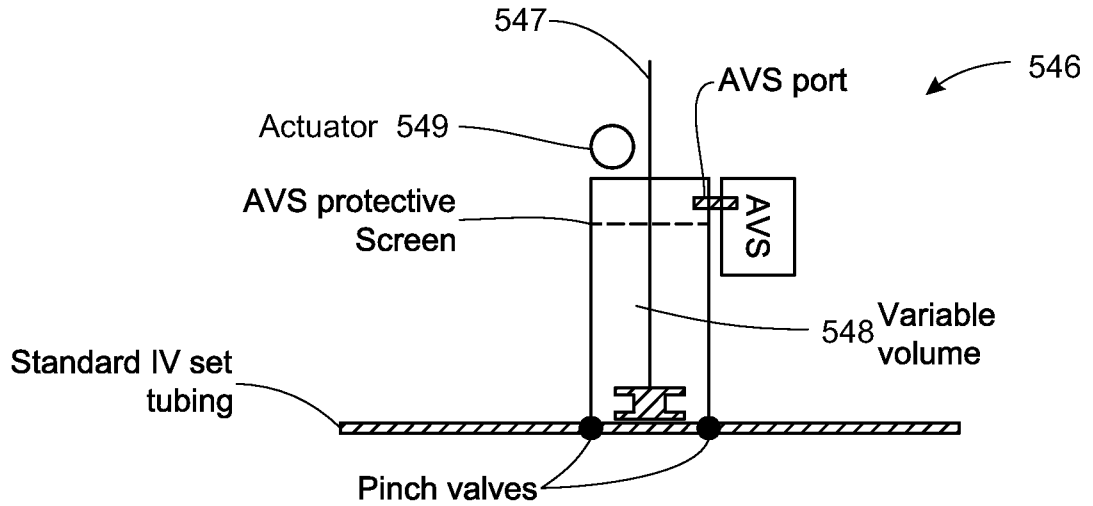


FIG. 136

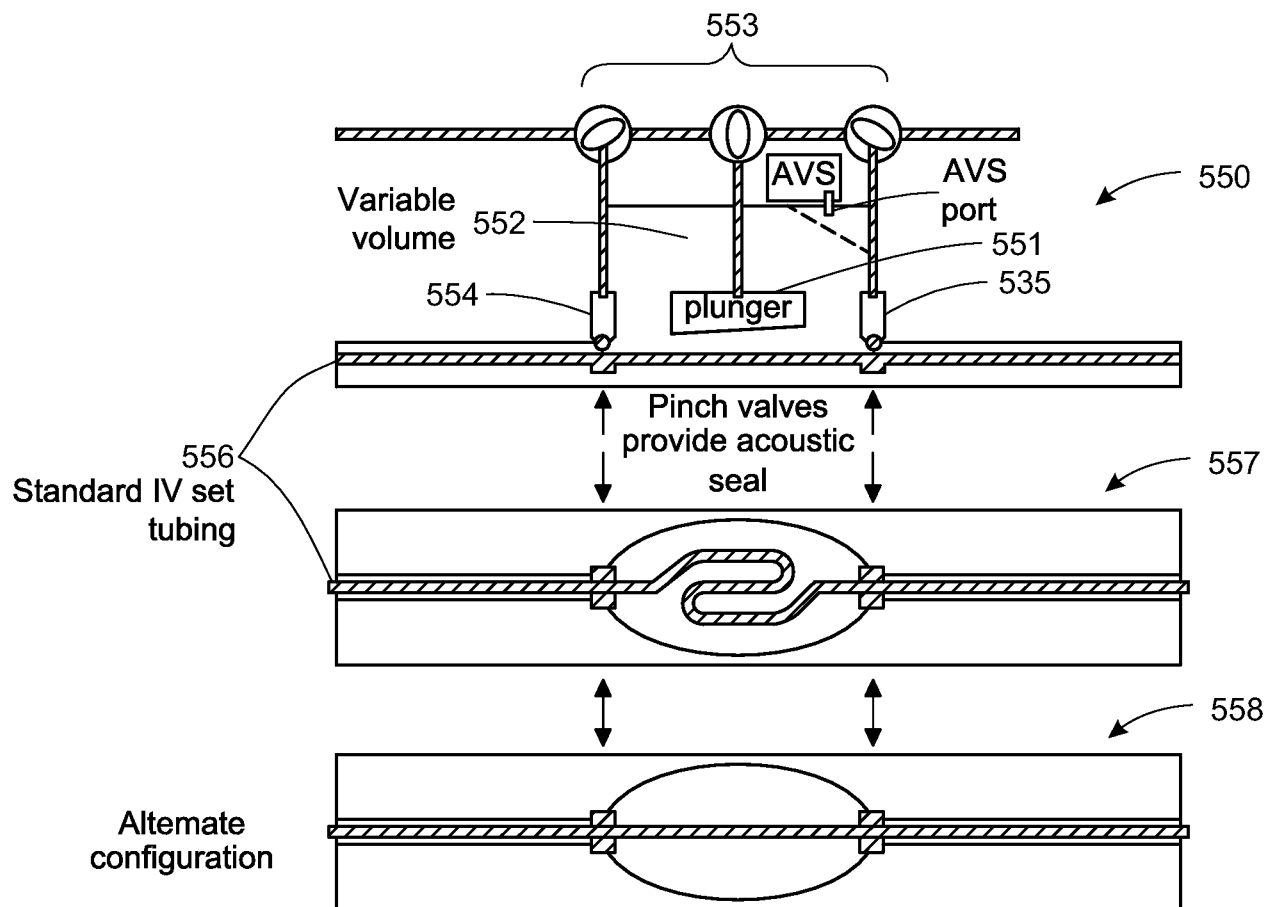


FIG. 137

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Mechanically actuated cassette free avs pumping design

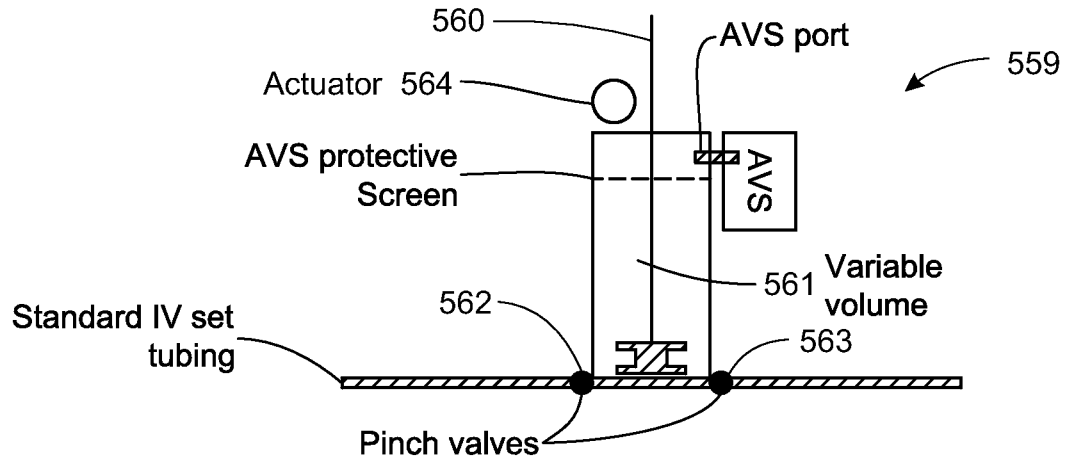


FIG. 138

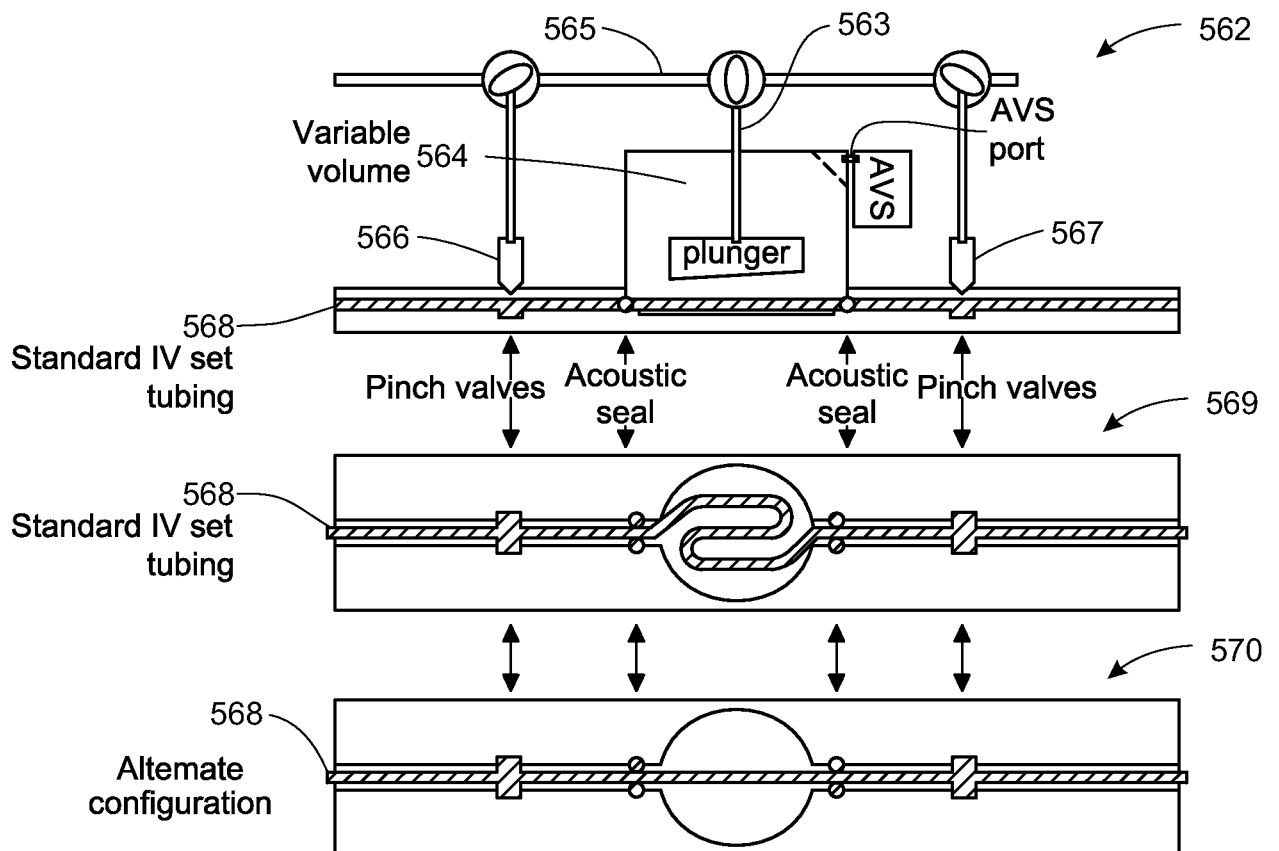


FIG. 139

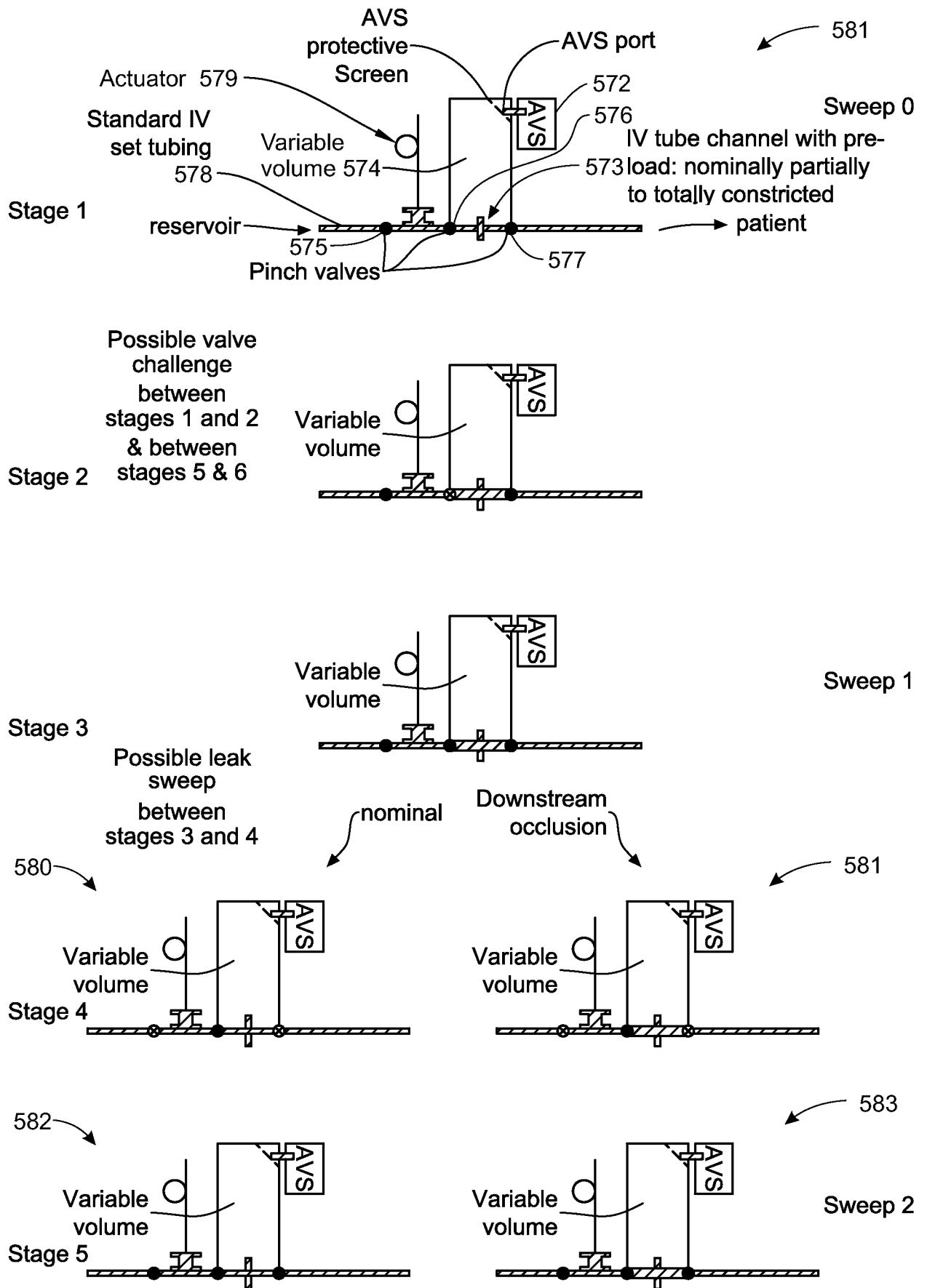


FIG. 140

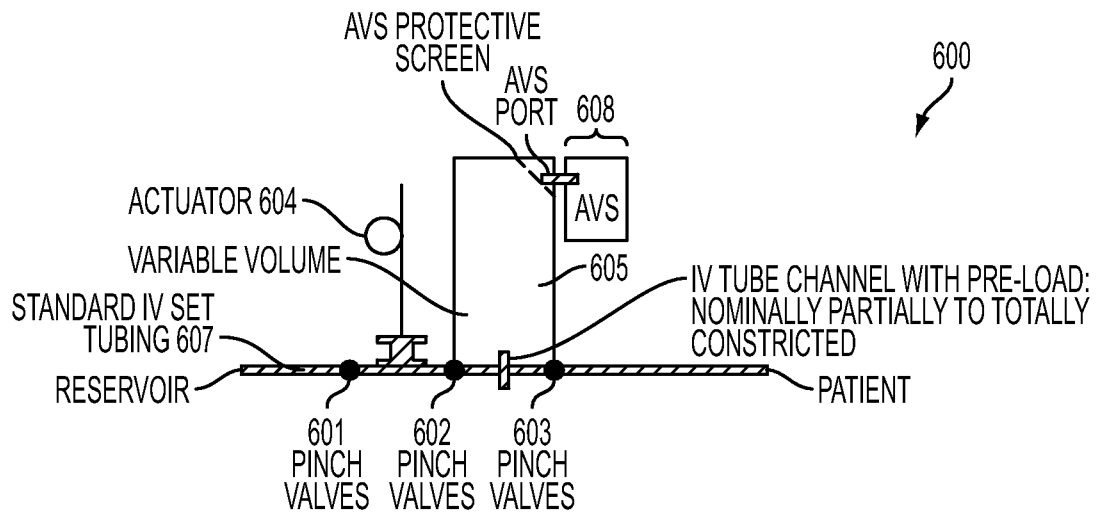


FIG. 141

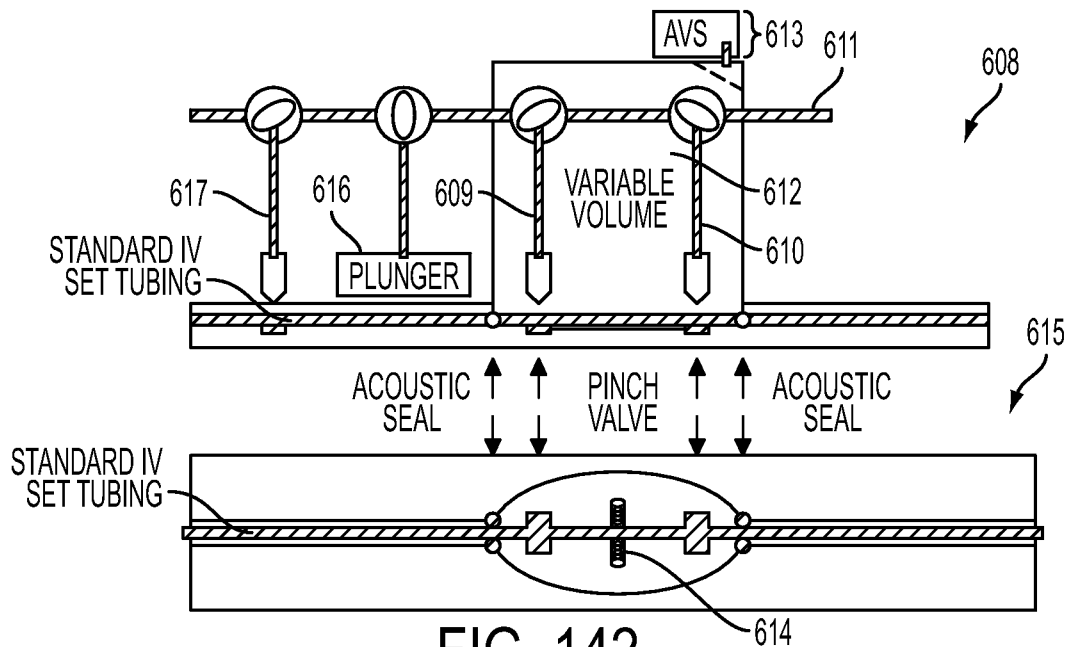


FIG. 142

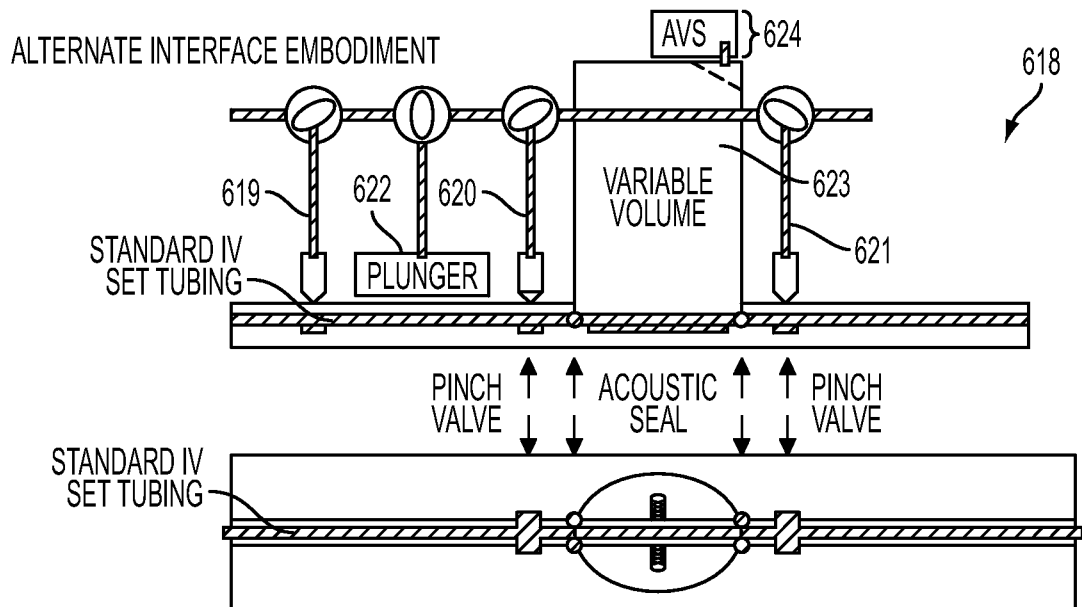


FIG. 143

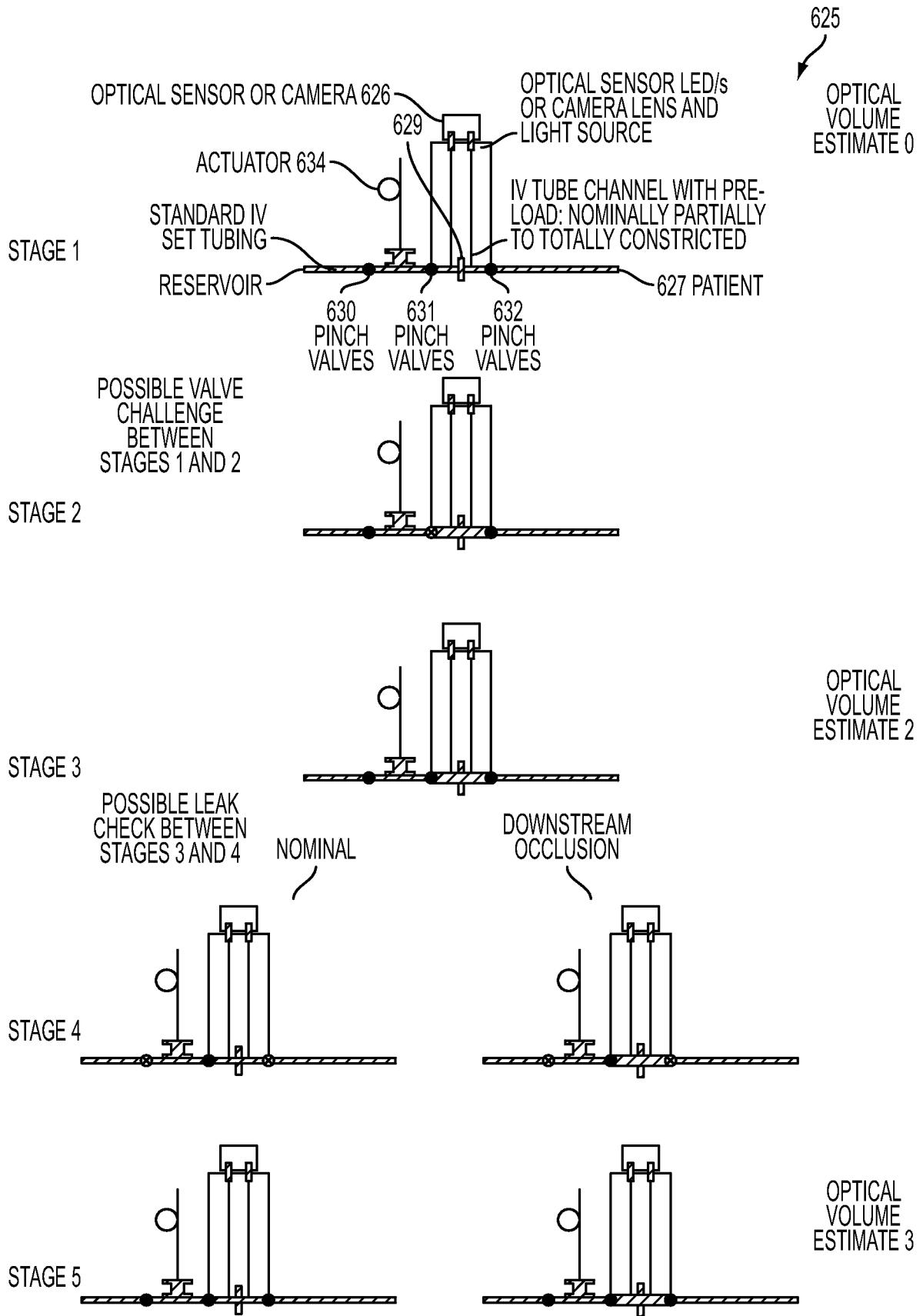


FIG. 144

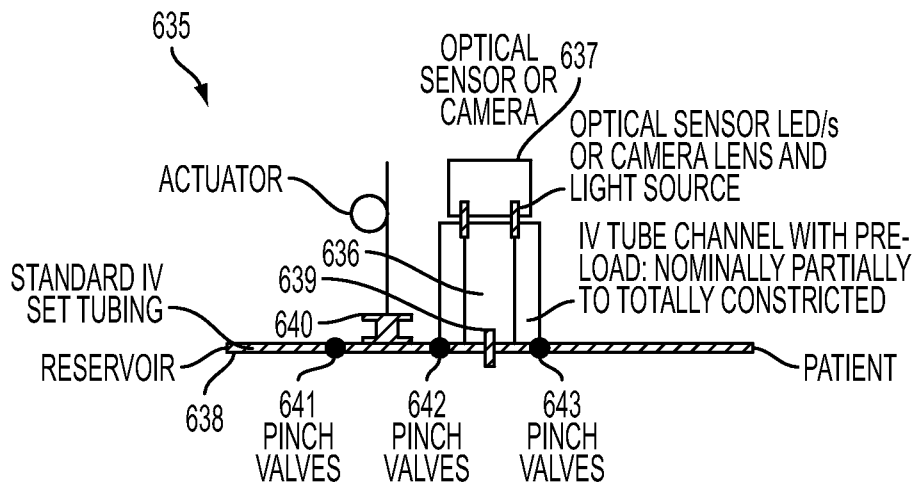


FIG. 145

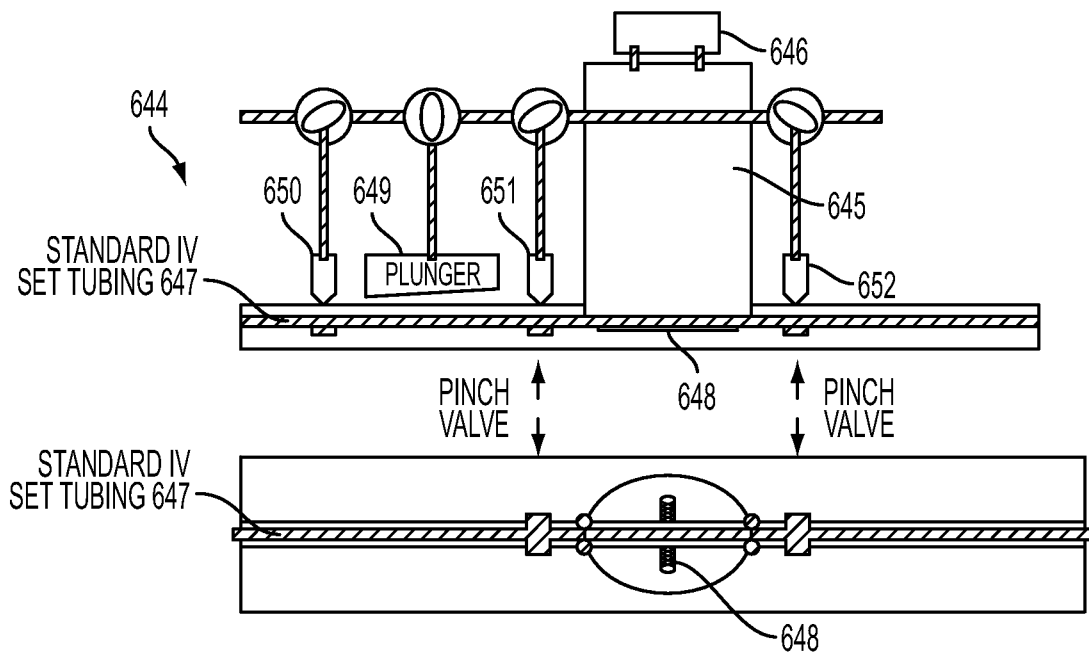


FIG. 146

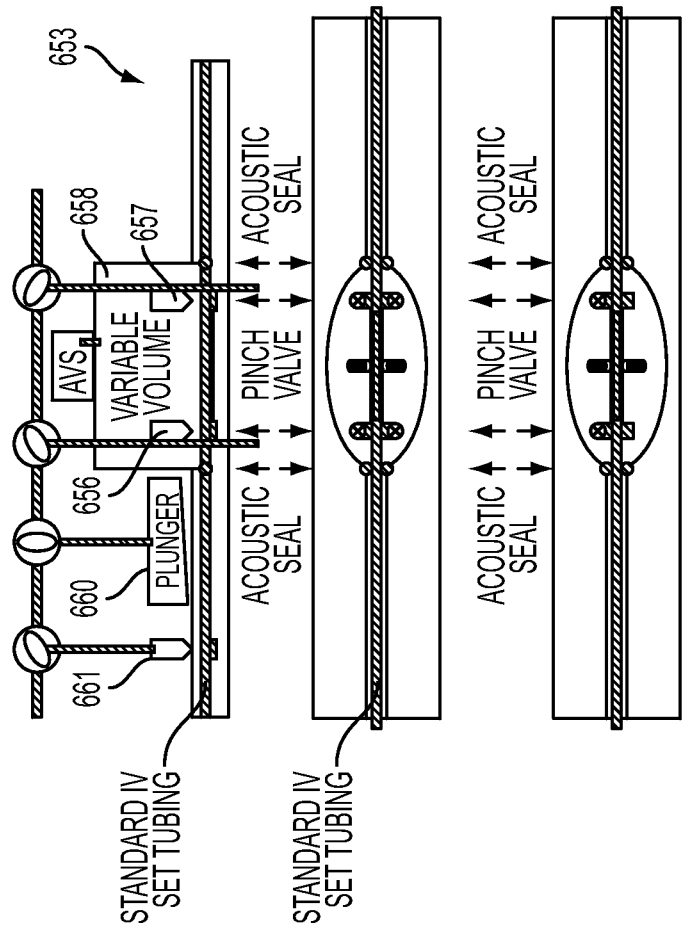
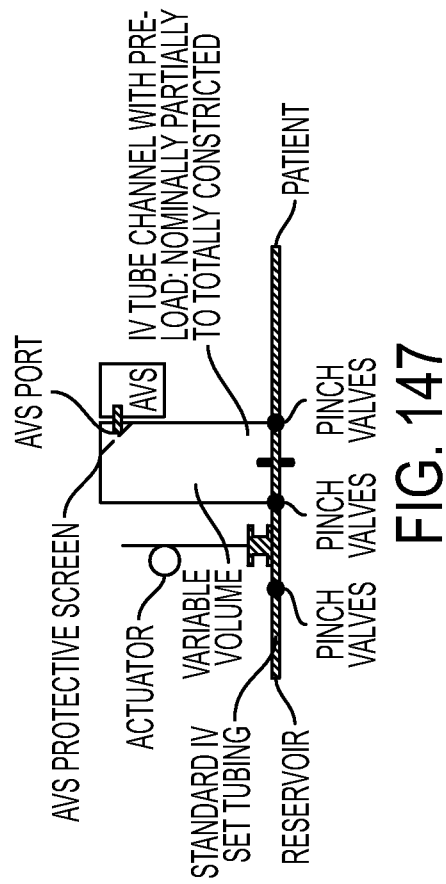


FIG. 148

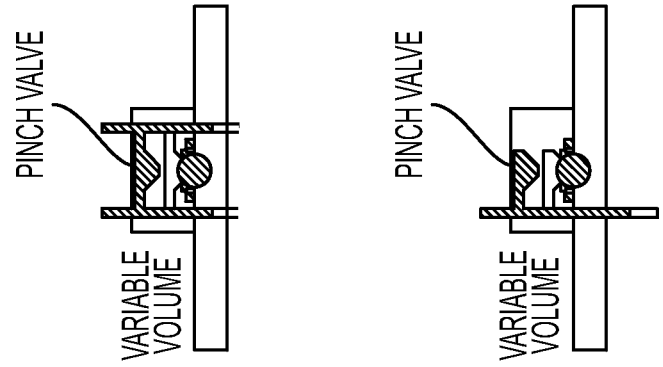


FIG. 149

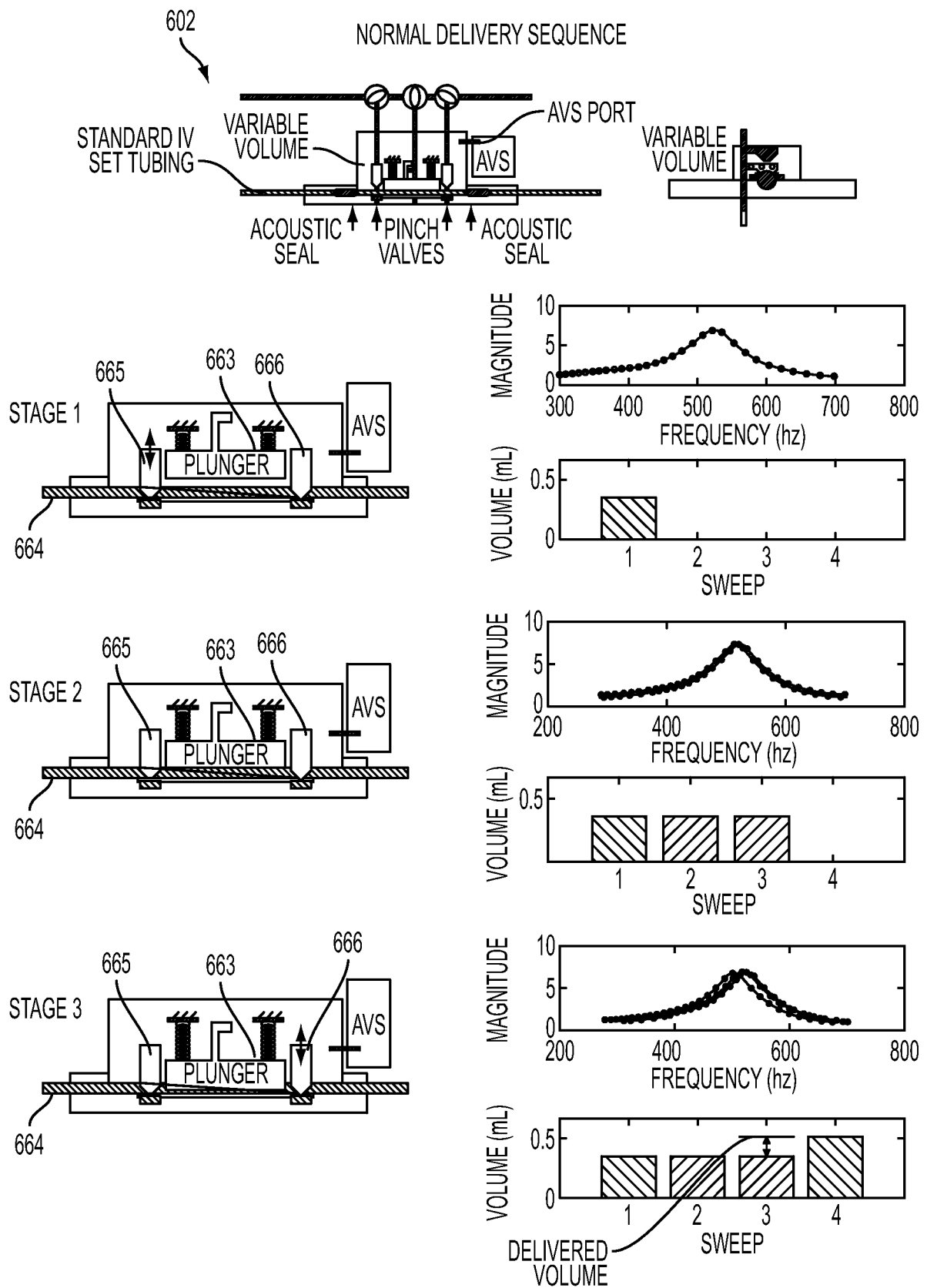


FIG. 150

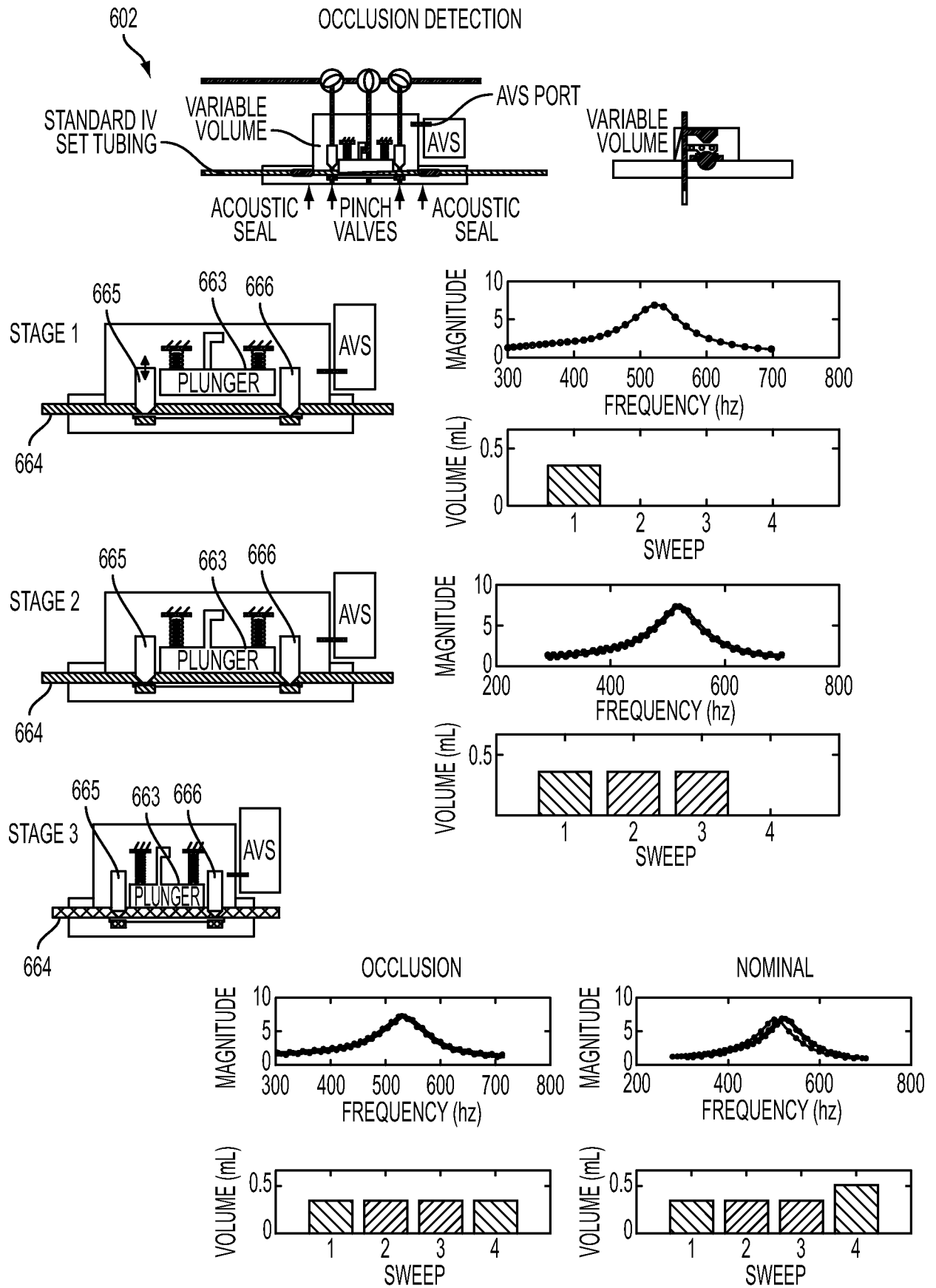


FIG. 151

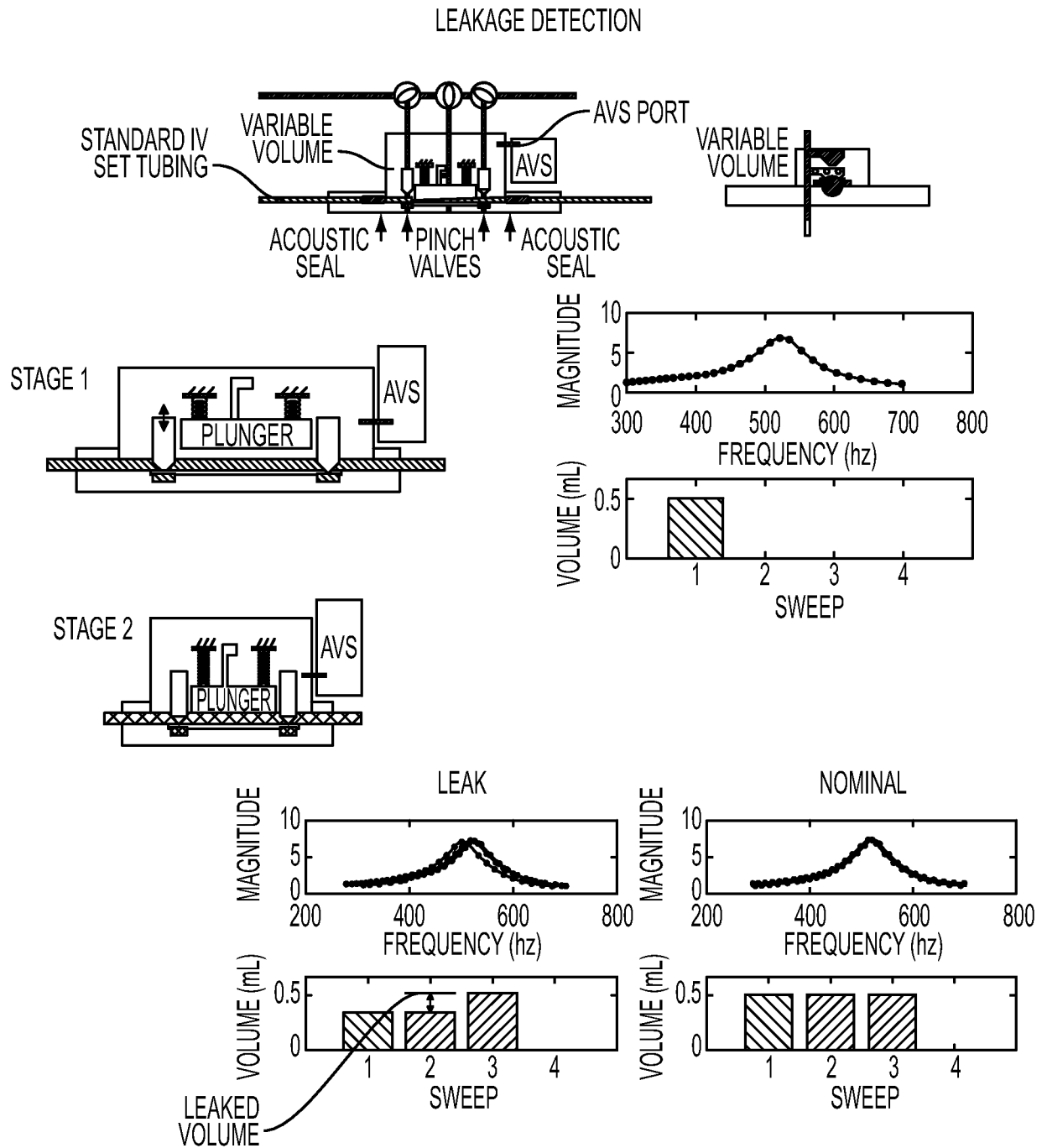


FIG. 152

FAILED VALVE/BUBBLE DETECTION

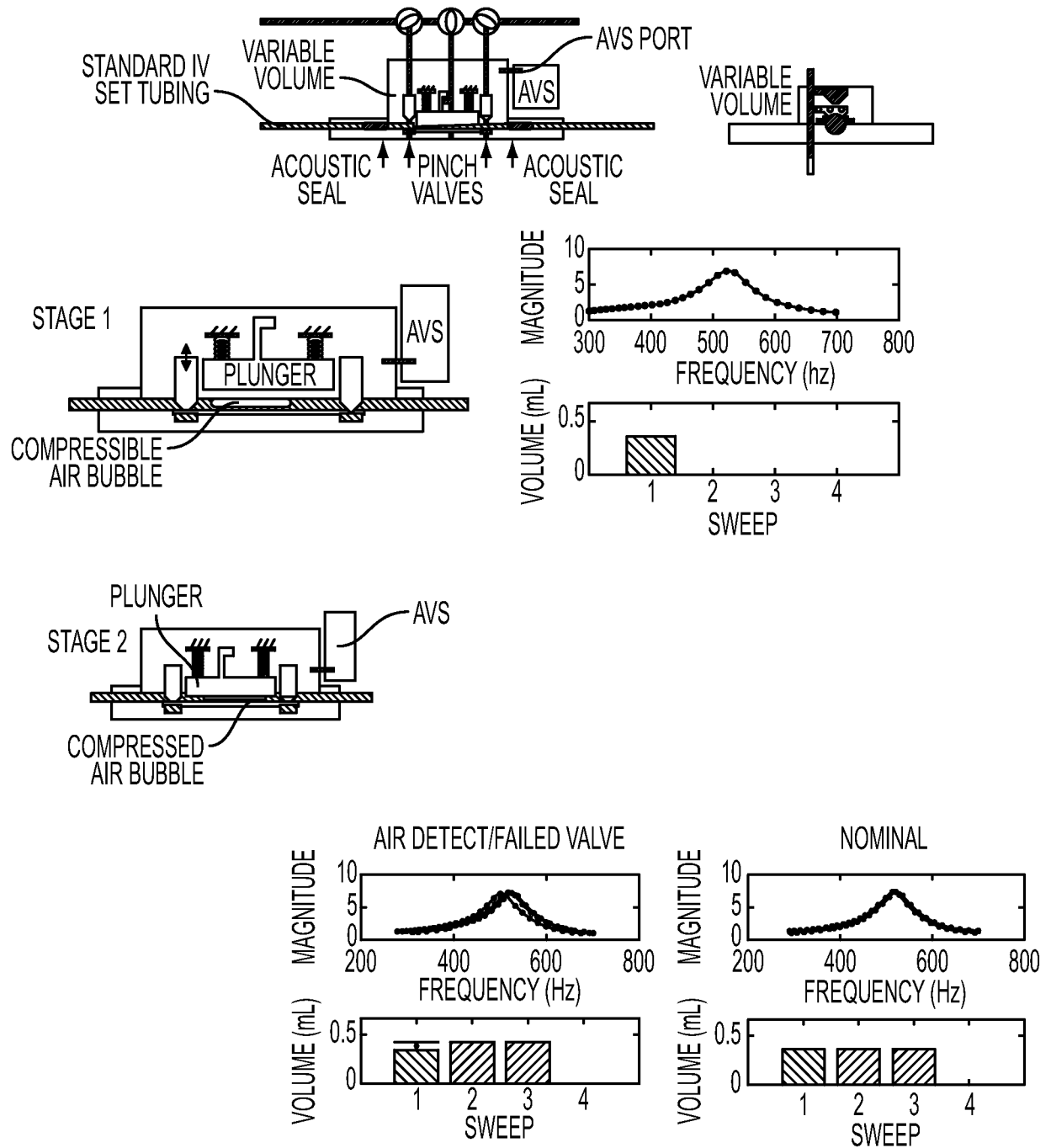


FIG. 153

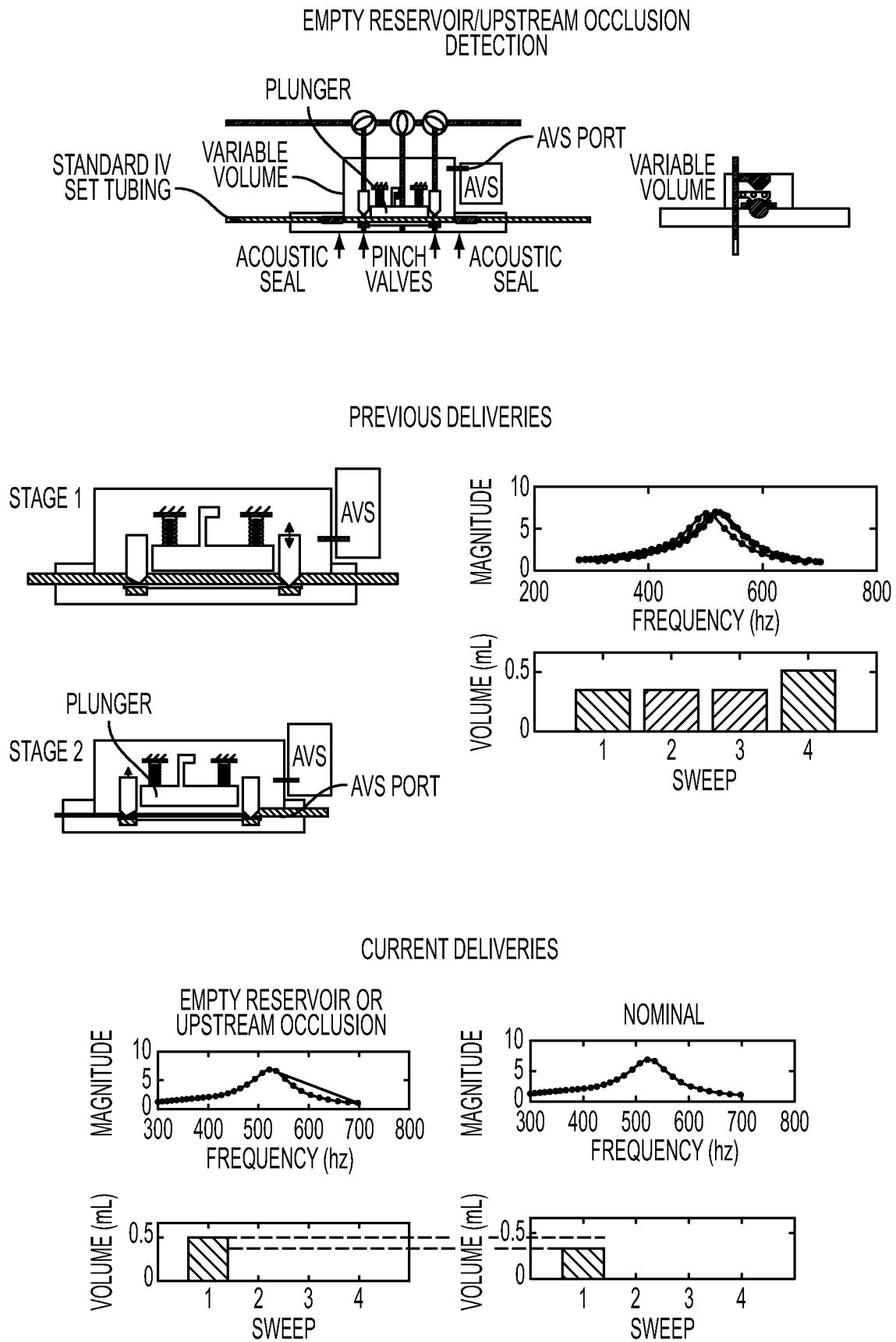


FIG. 154

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Free-Flow Detection

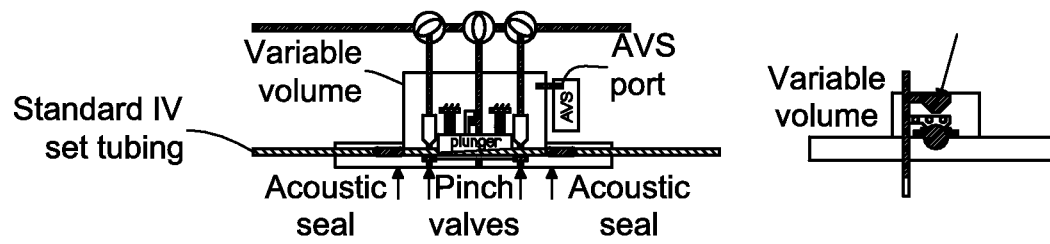


FIG. 155

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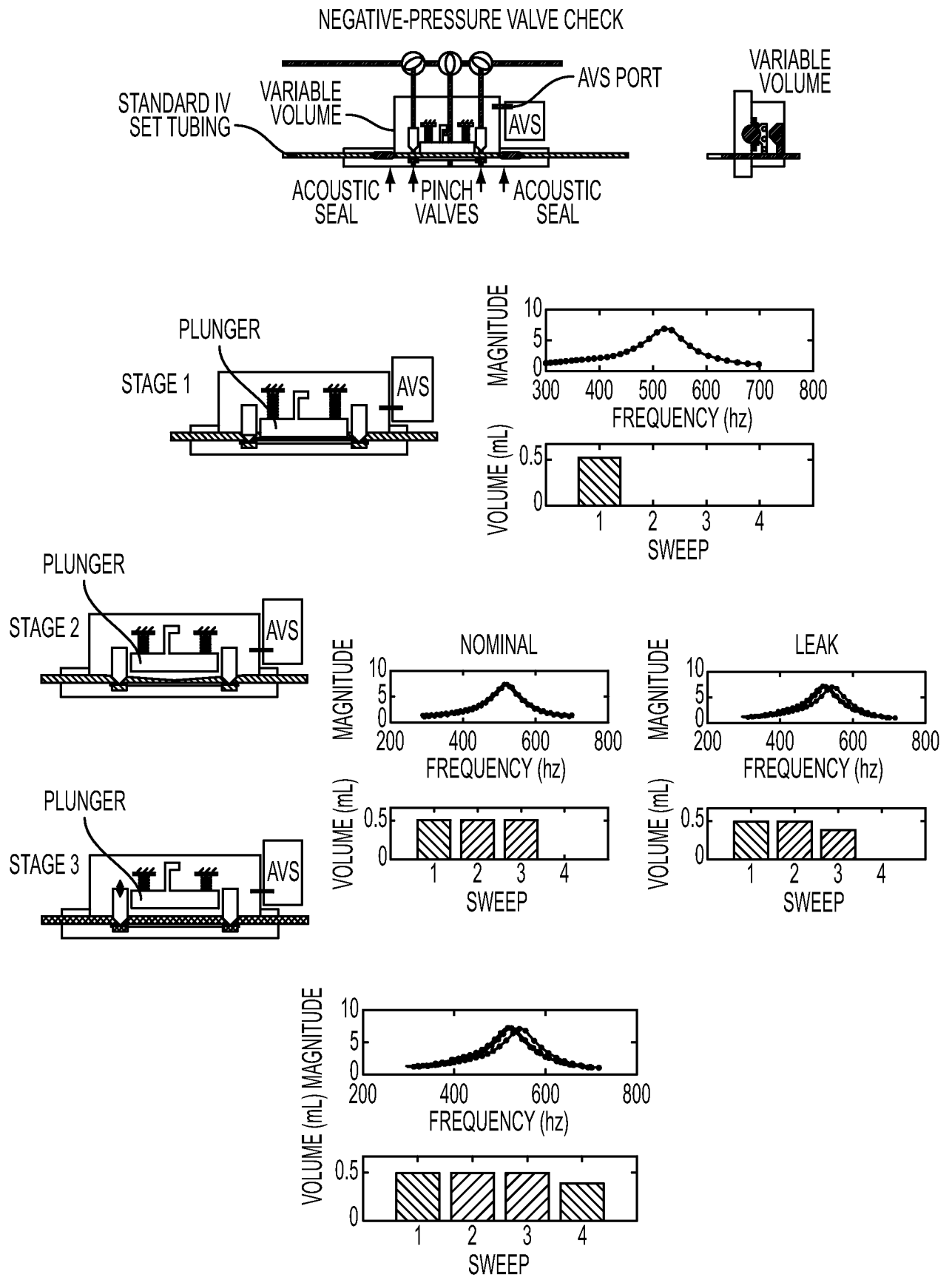


FIG. 156

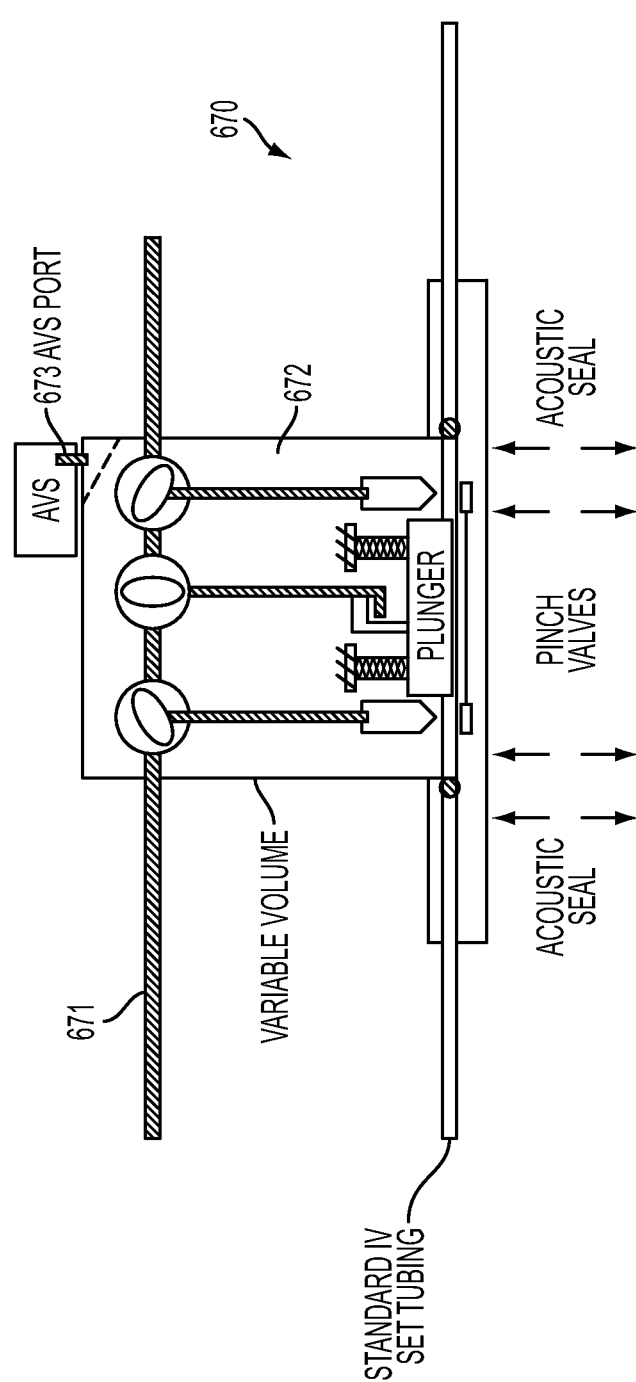


FIG. 157

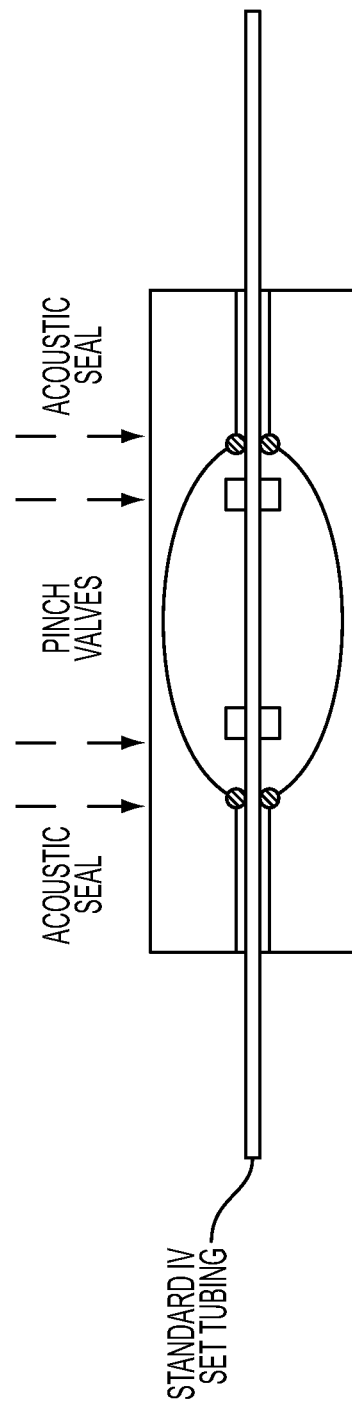


FIG. 158

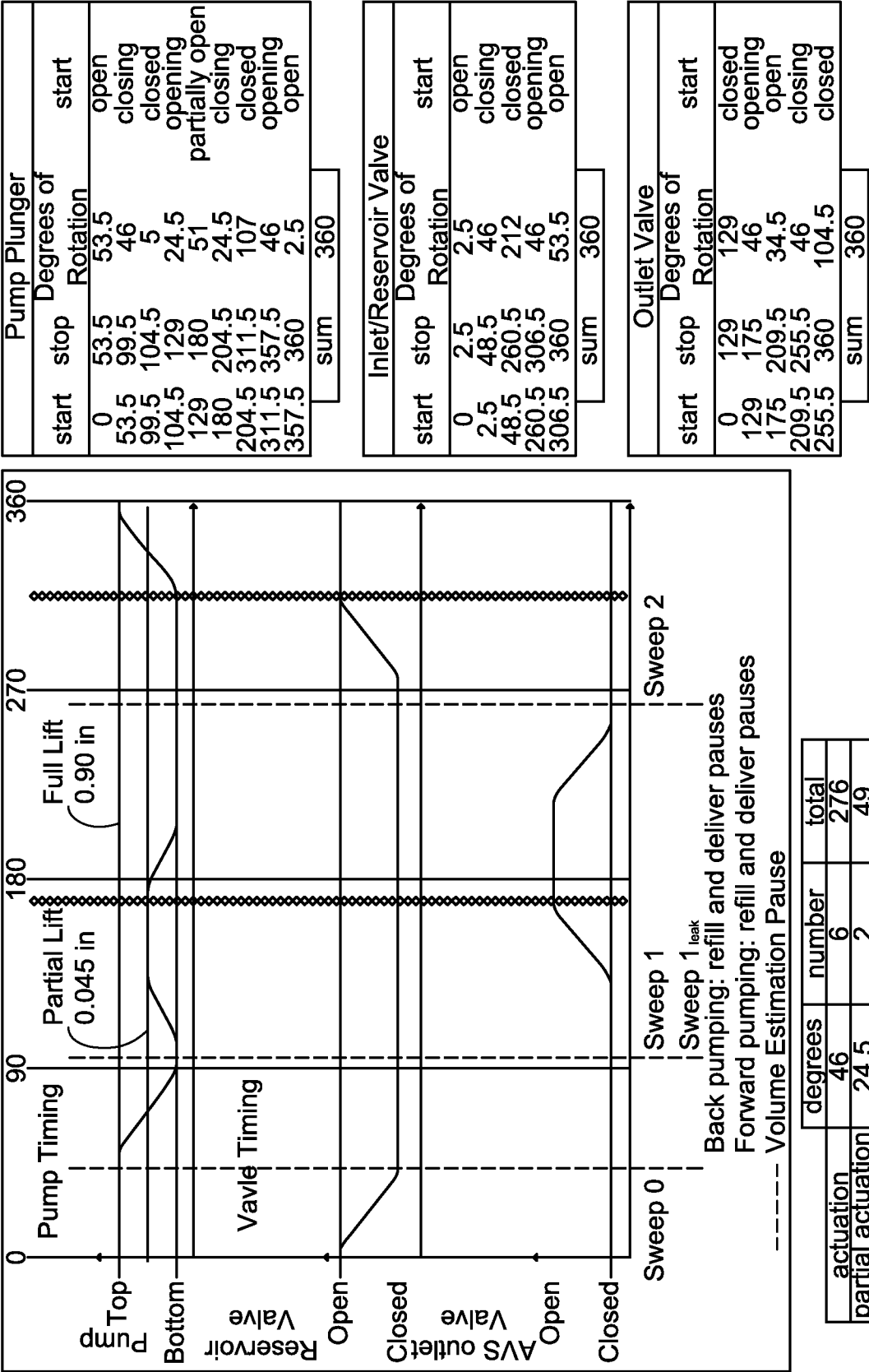


FIG. 159

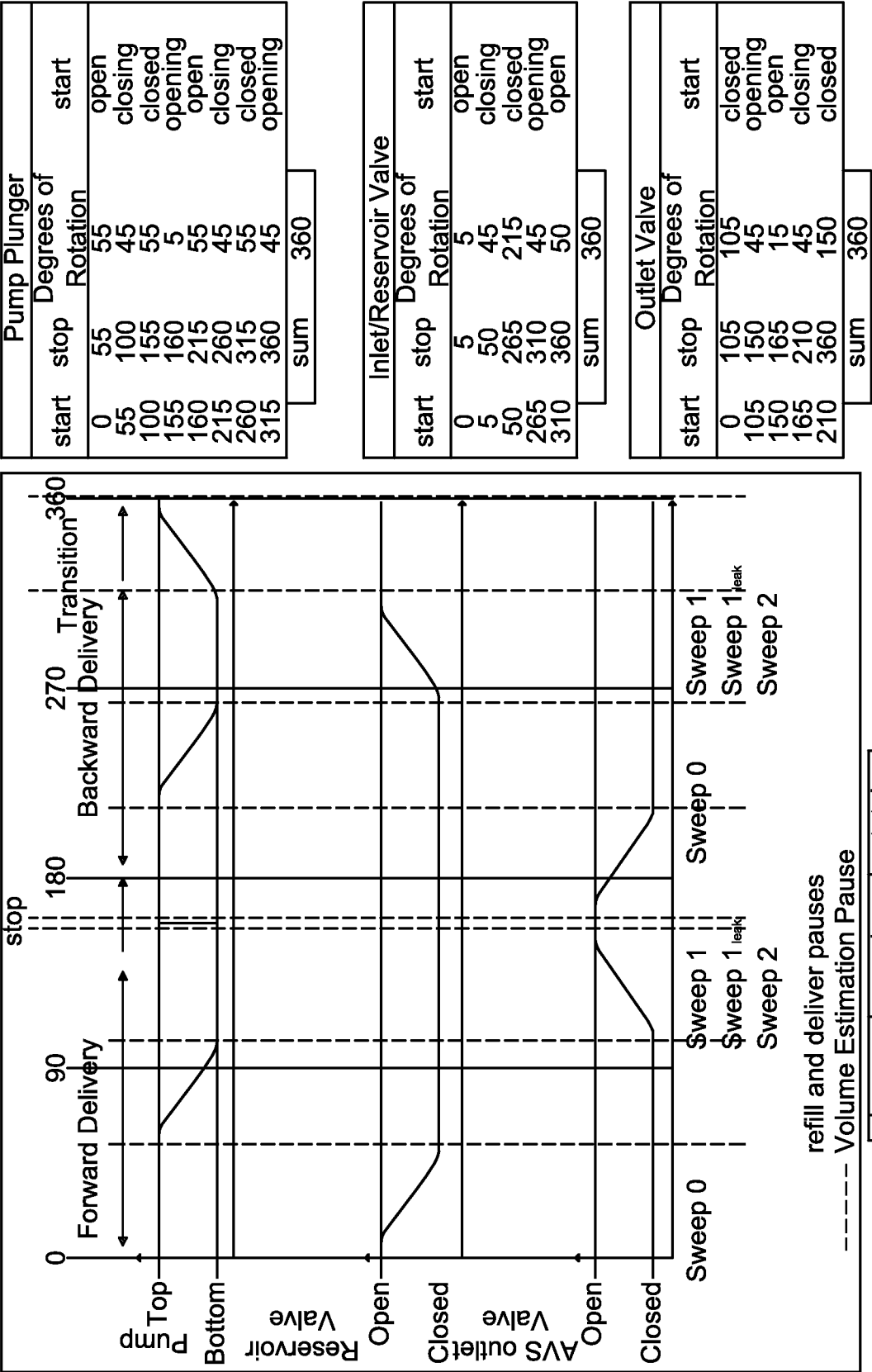


FIG. 160

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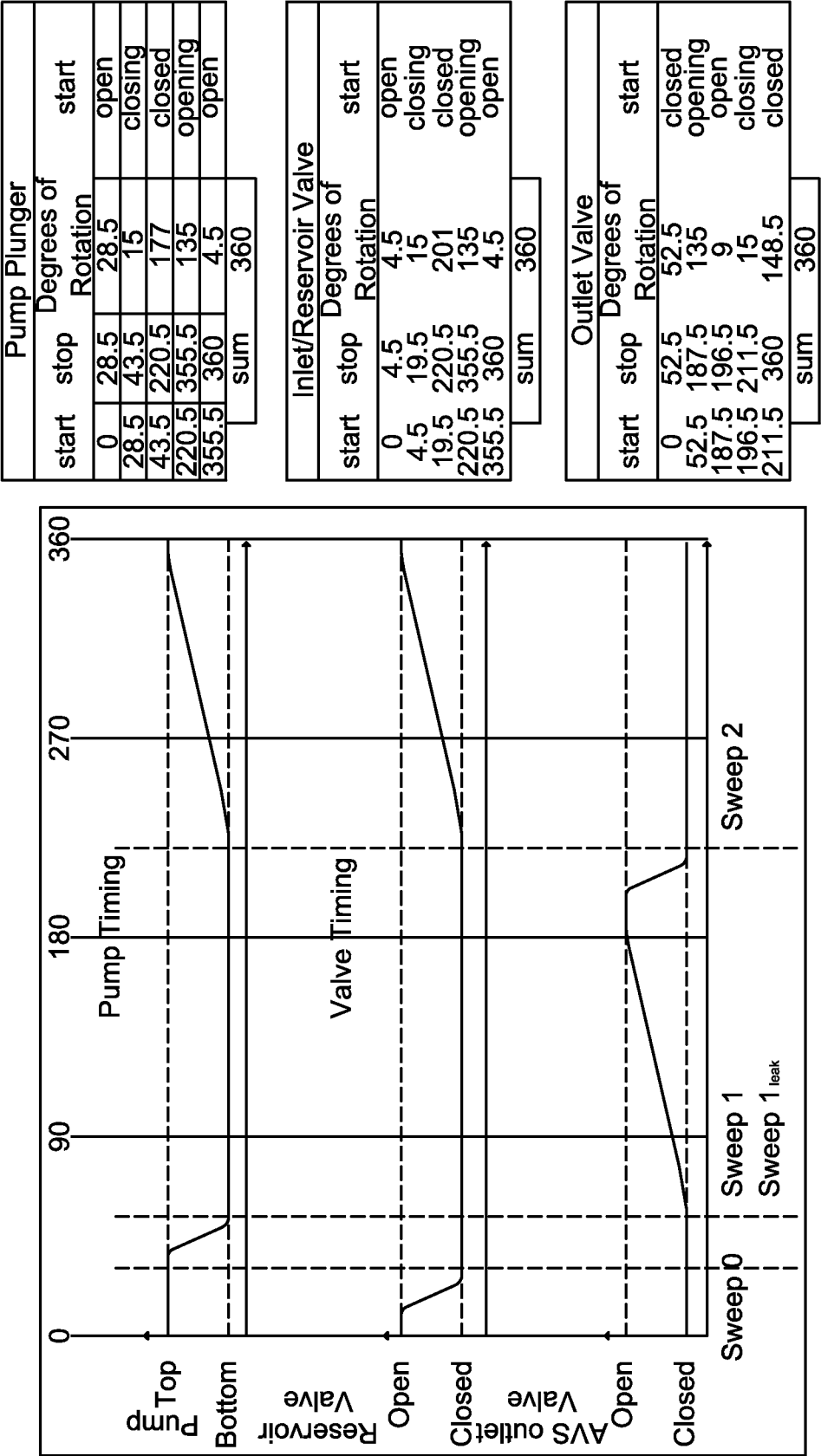


FIG. 161

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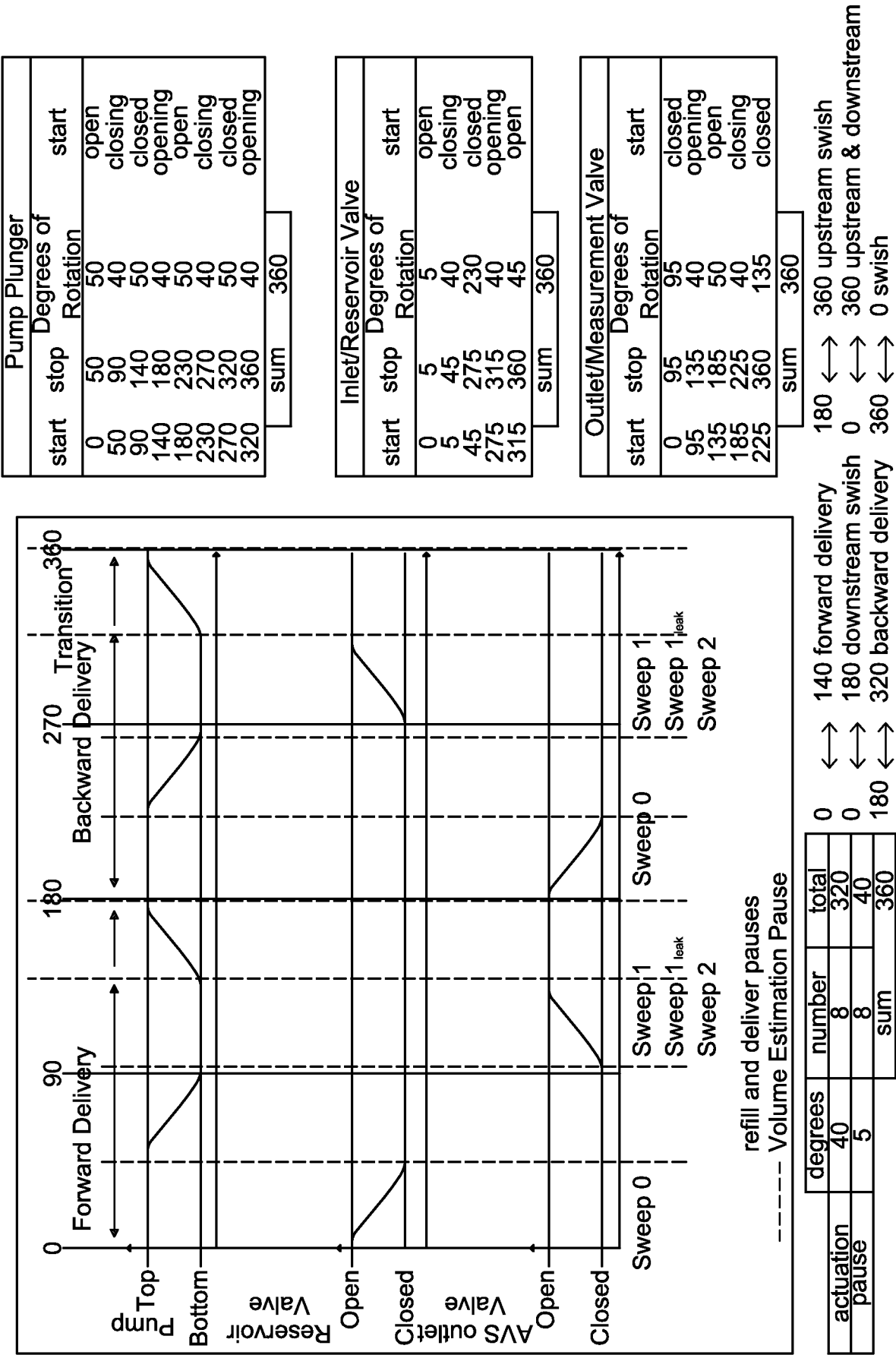


FIG.162

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$(\Delta V)_{\text{DELIVERED}} = \text{FULL SWEEP} - \text{EMPTY}$
 $(\Delta V)_{\text{FULLSWEEP1-FULLSWEEP2}}$
 $(\Delta V)_{\text{EXITVALVEFAIL OR AIR DETECT}} = \text{INITIALSWEEP-FULL SWEEP}$

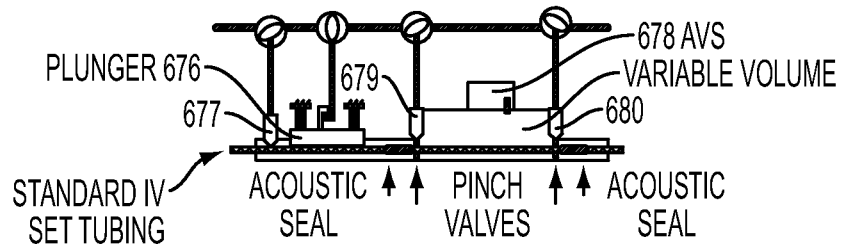
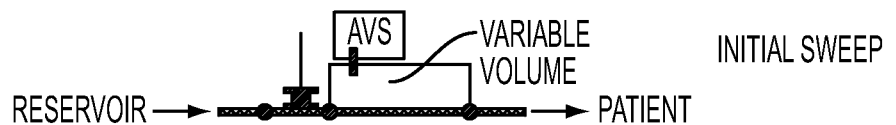


FIG. 163

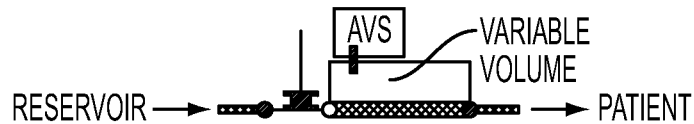
STAGE

DELIVERY SEQUENCE

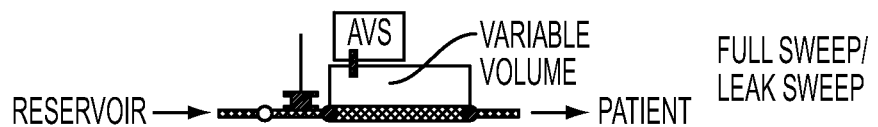
1 NOMINAL STATE



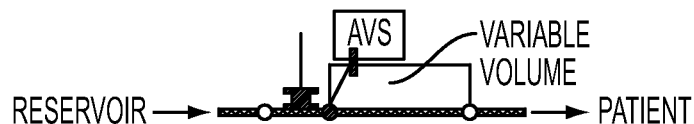
2 FILL STATE



3 PRESSURIZED/REFILL STATE



4 DELIVERY STATE



5

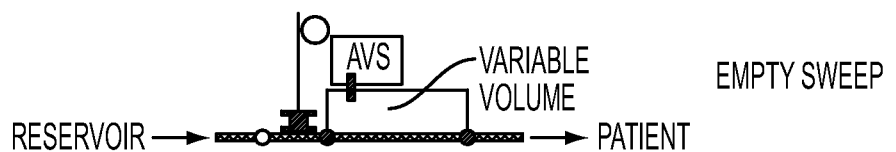


FIG. 164

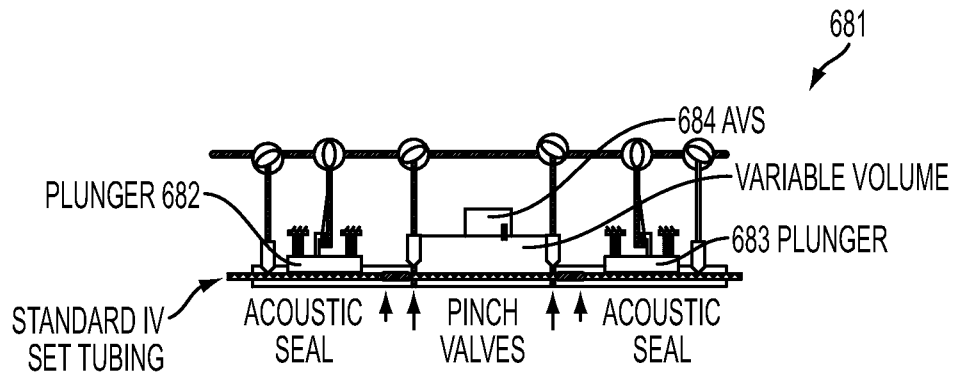


FIG. 165

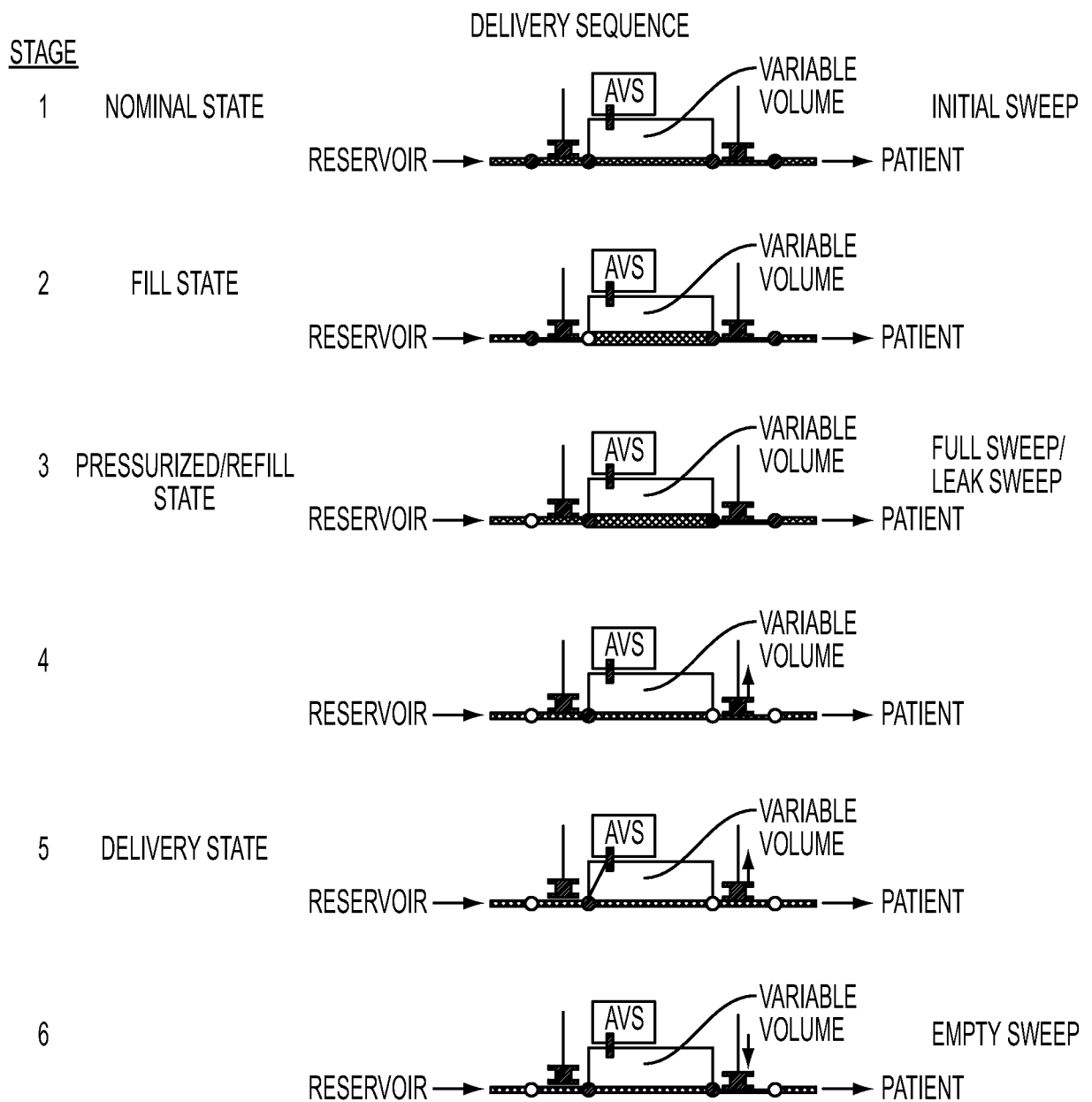


FIG. 166

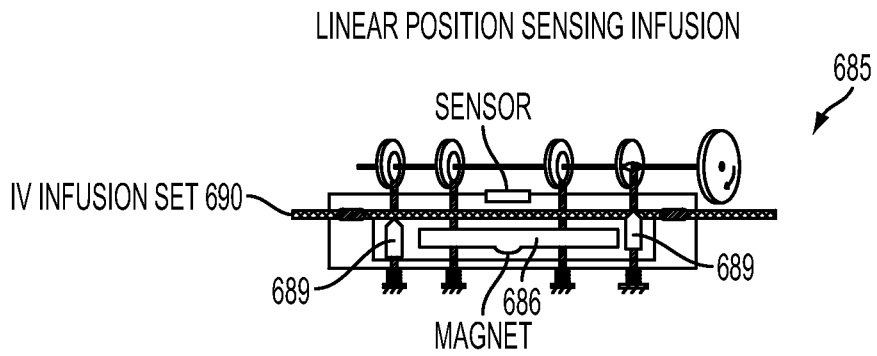


FIG. 167

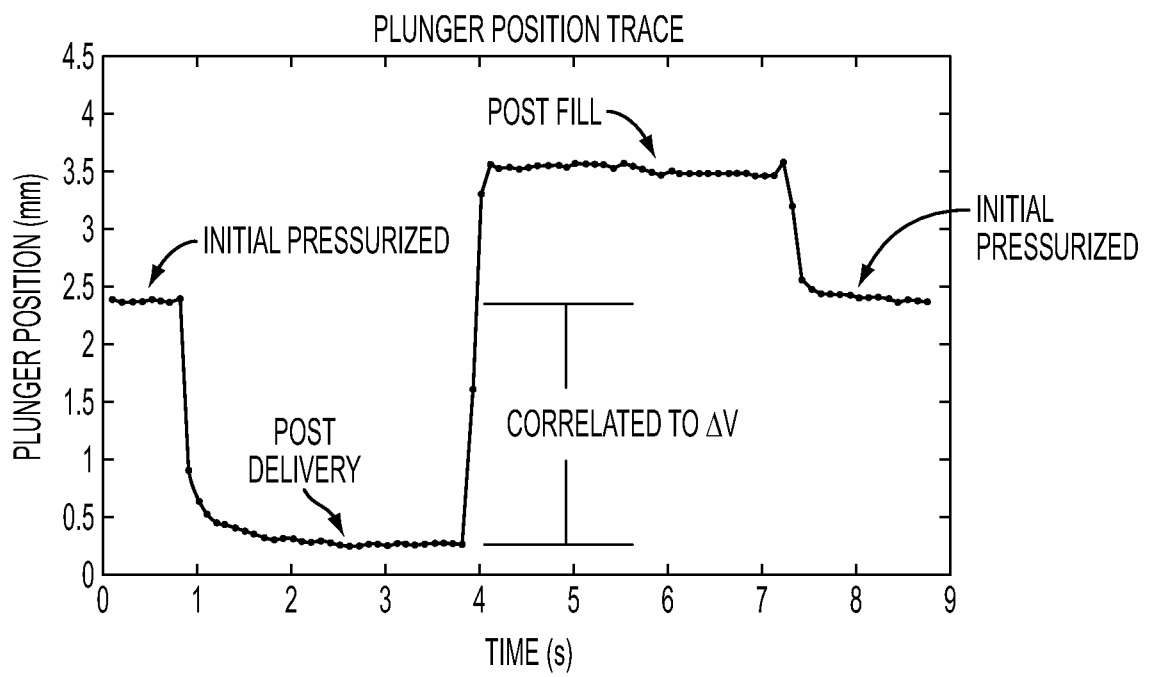


FIG. 168

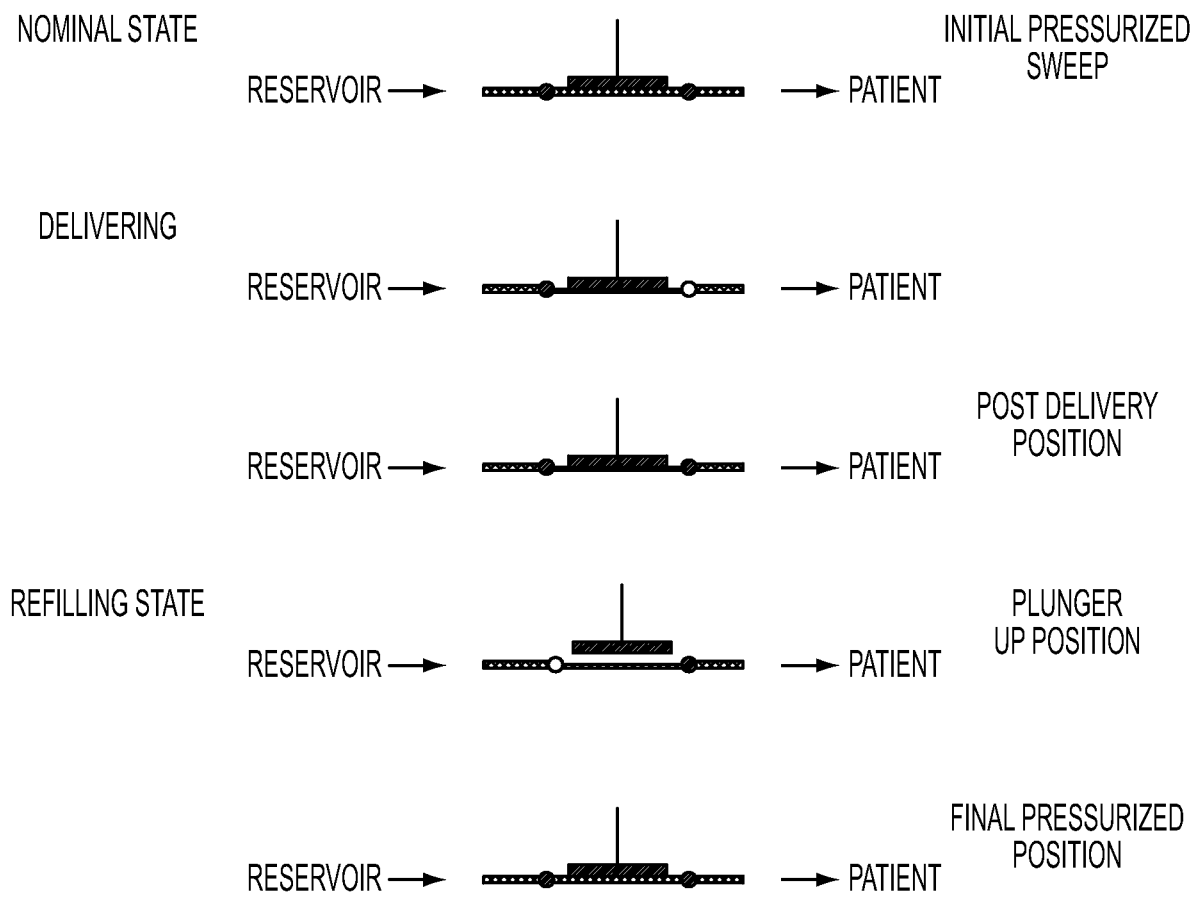


FIG. 169

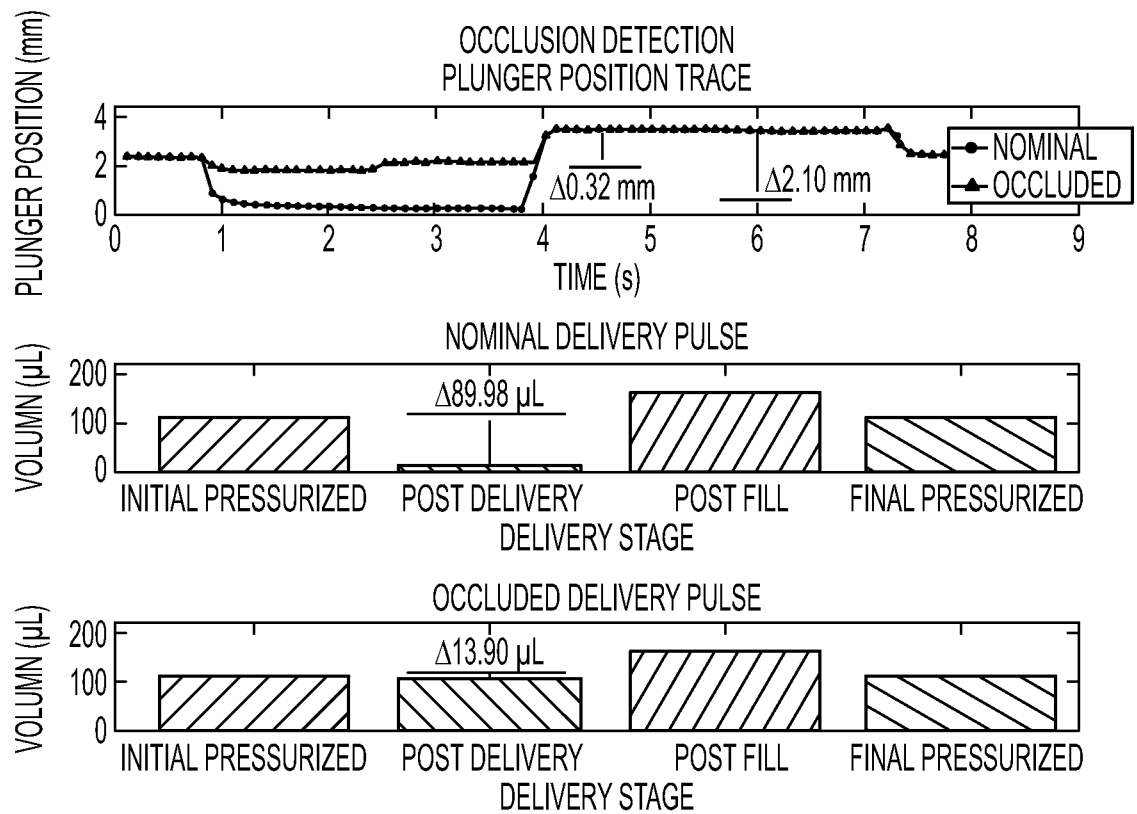


FIG. 170

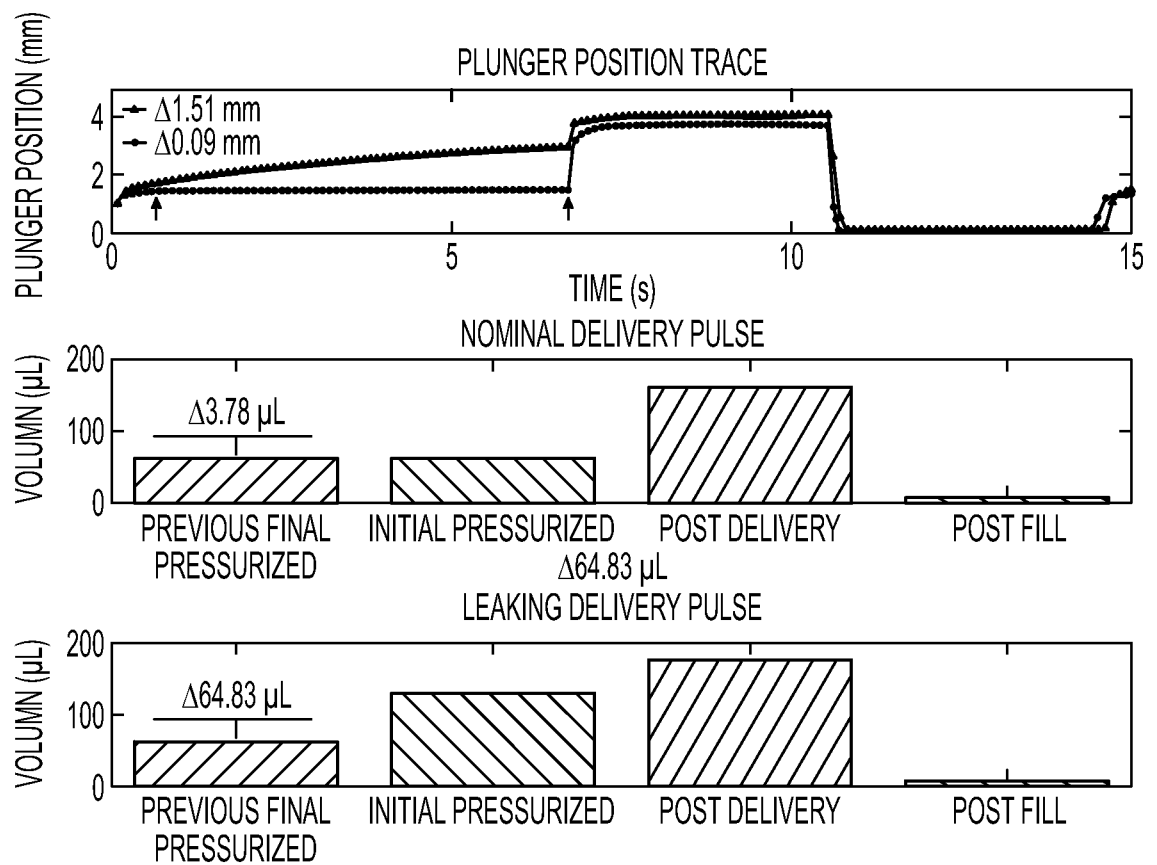


FIG. 171

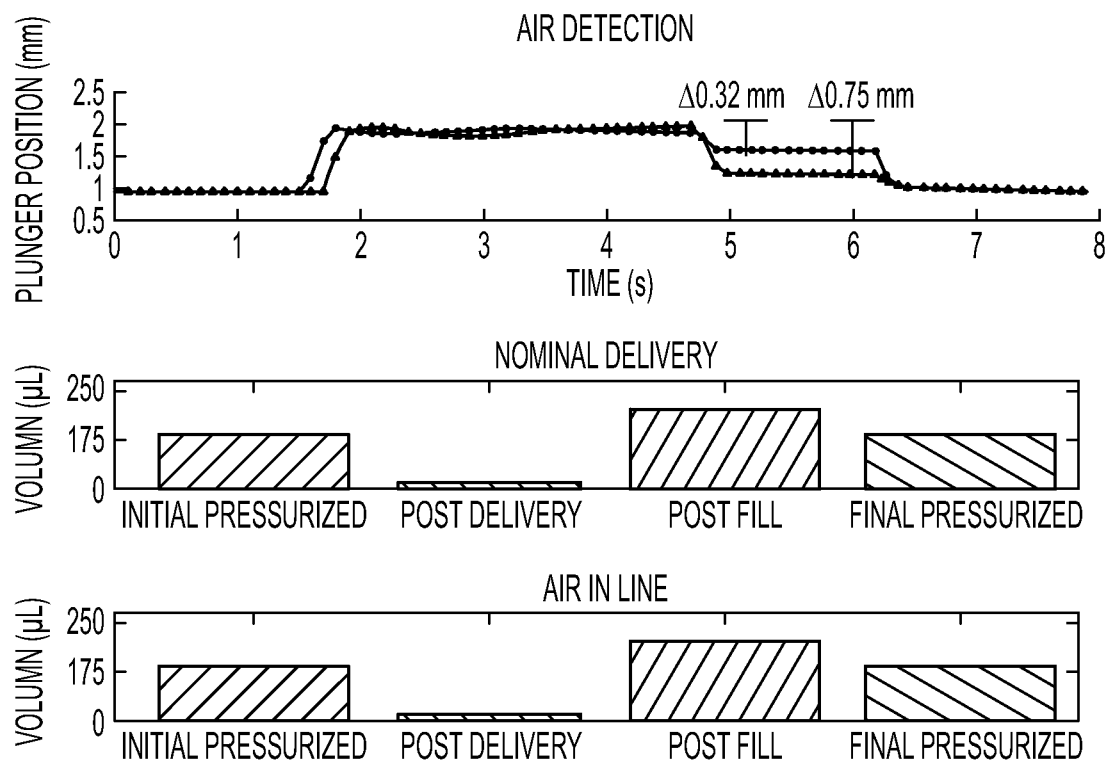


FIG. 172

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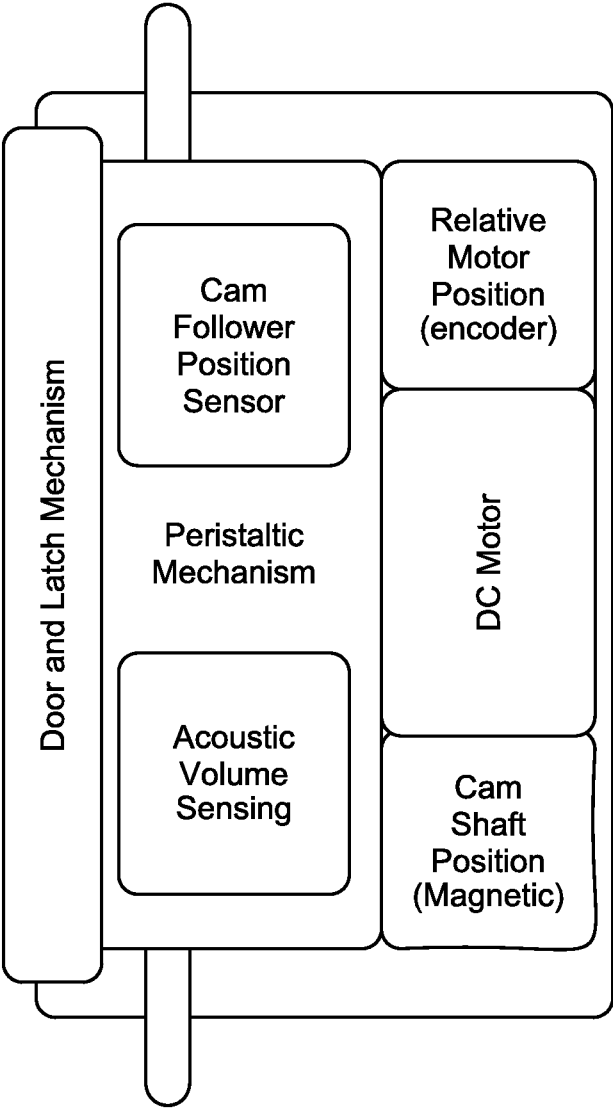


Fig. 173

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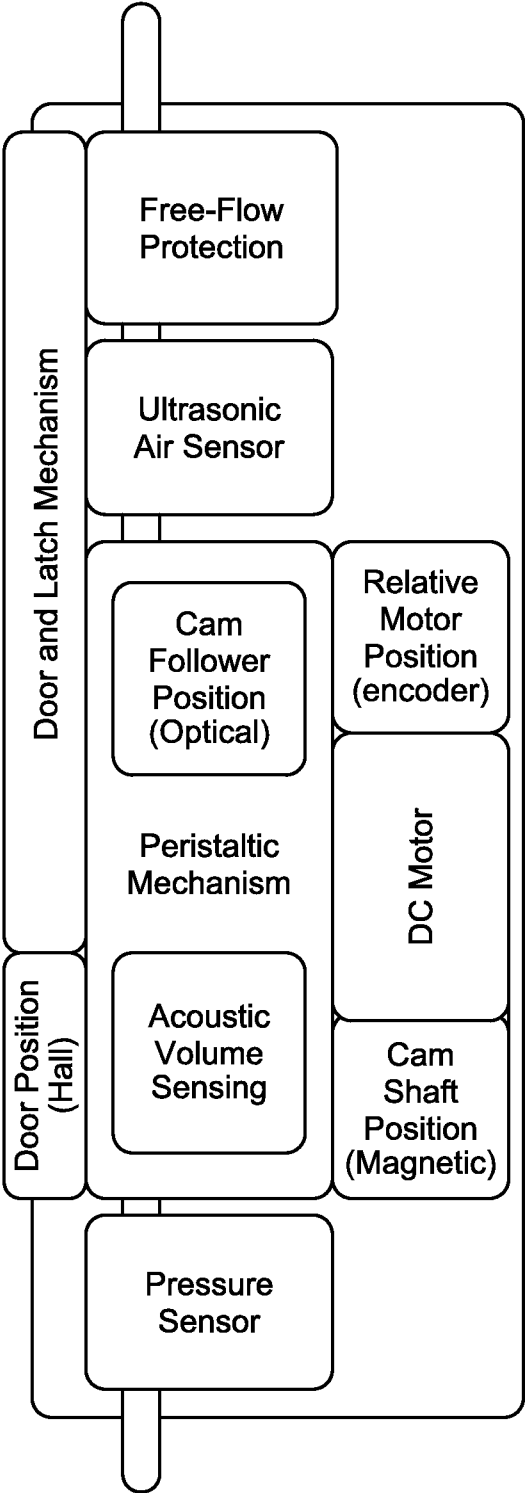


Fig. 174

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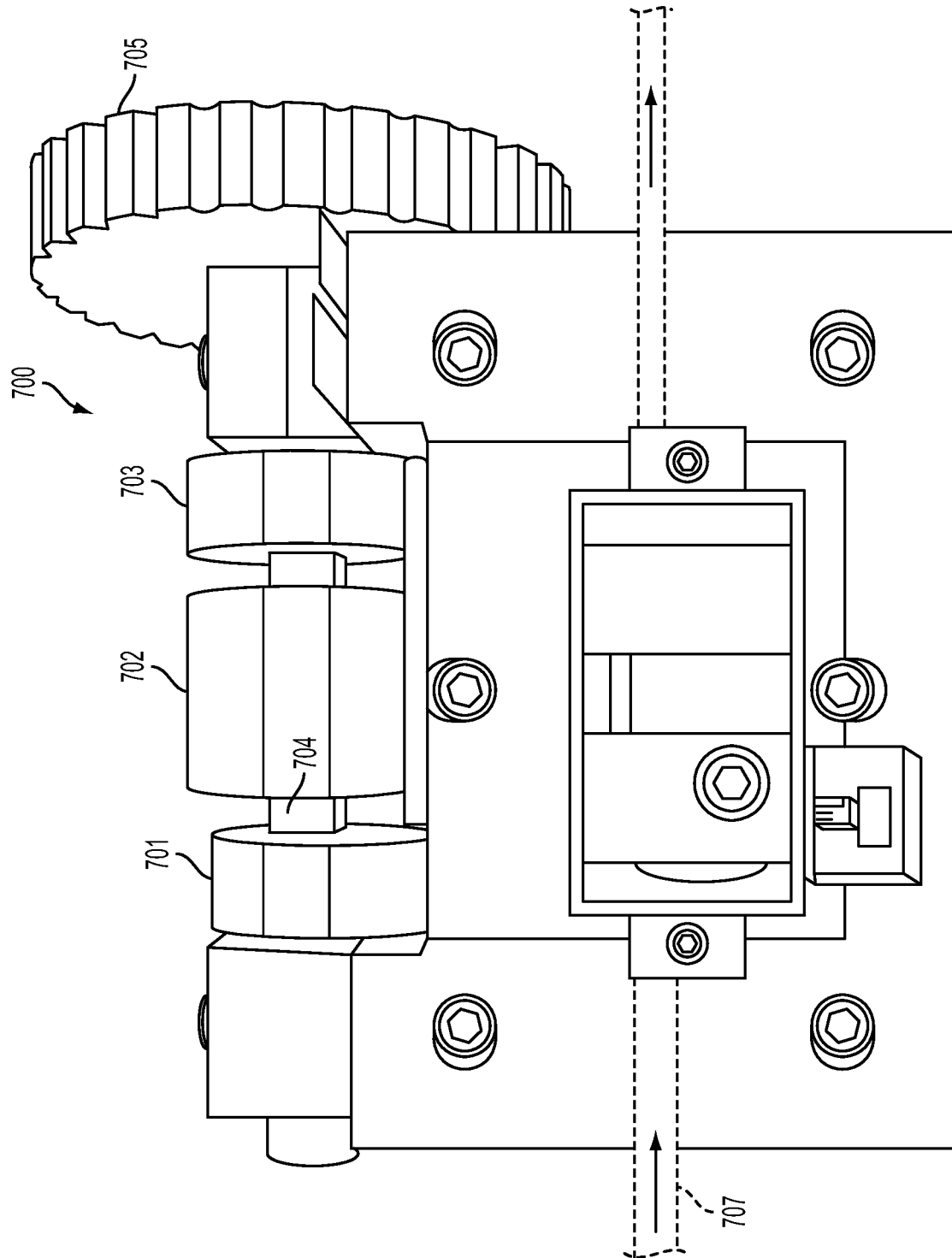


FIG. 175

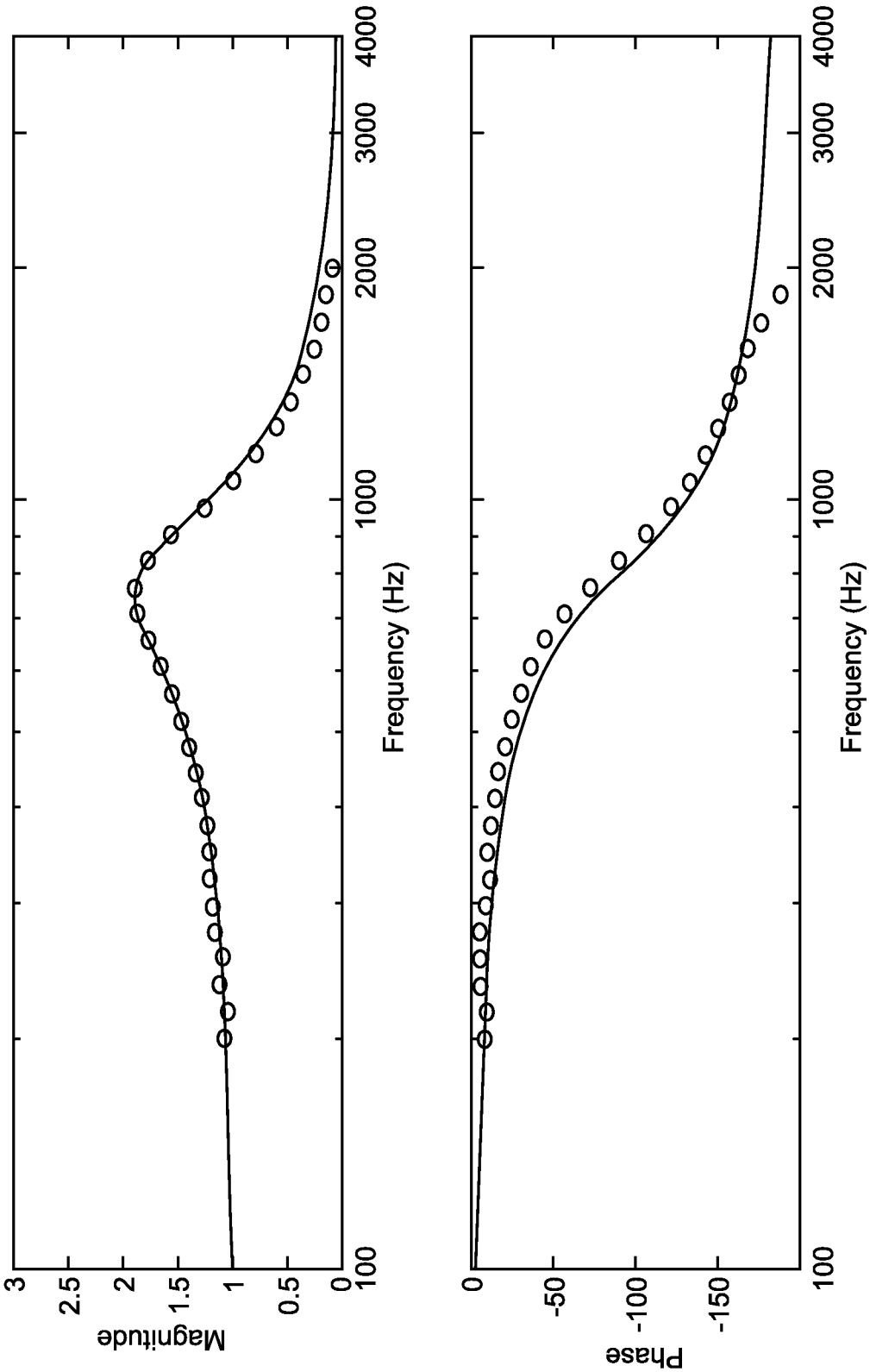


Fig. 176

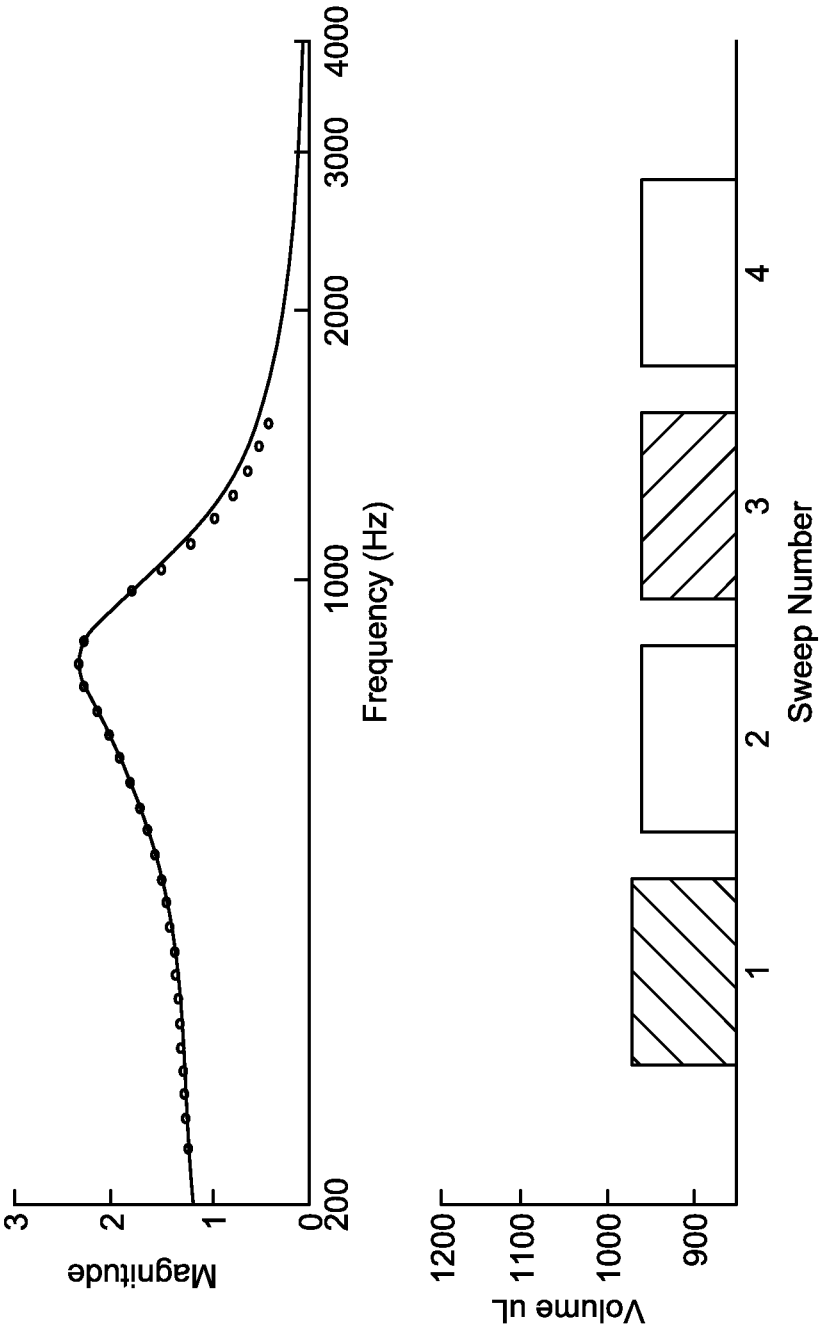


Fig. 177

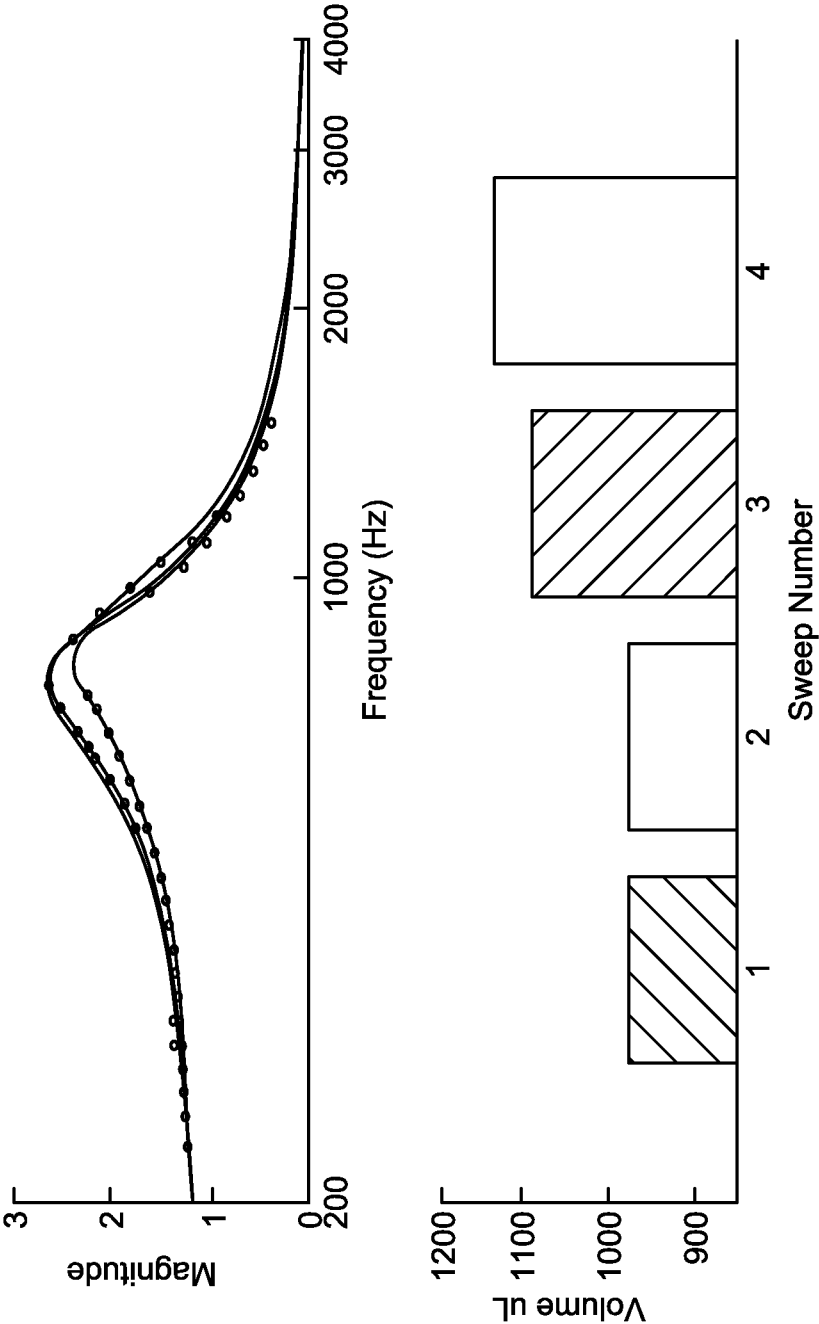


Fig. 178

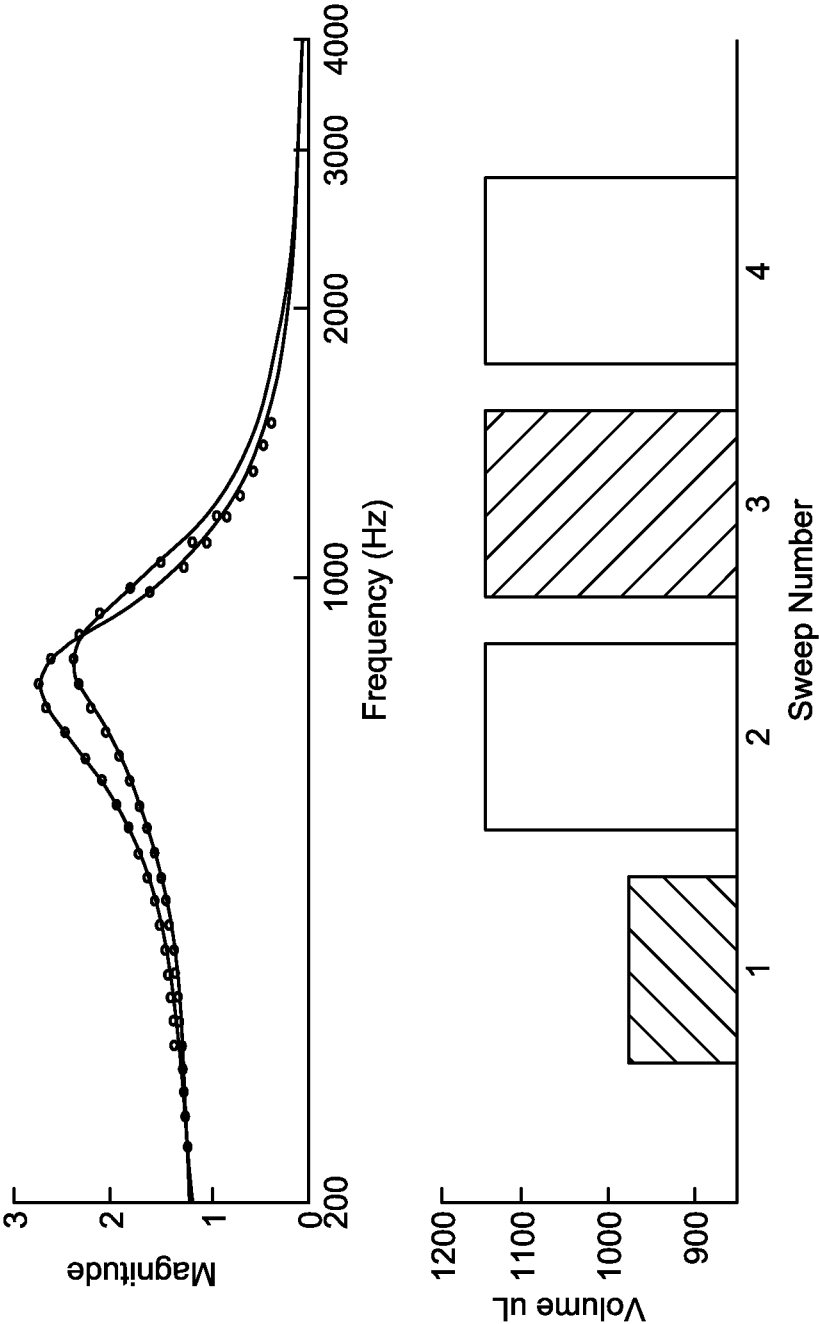


Fig. 179

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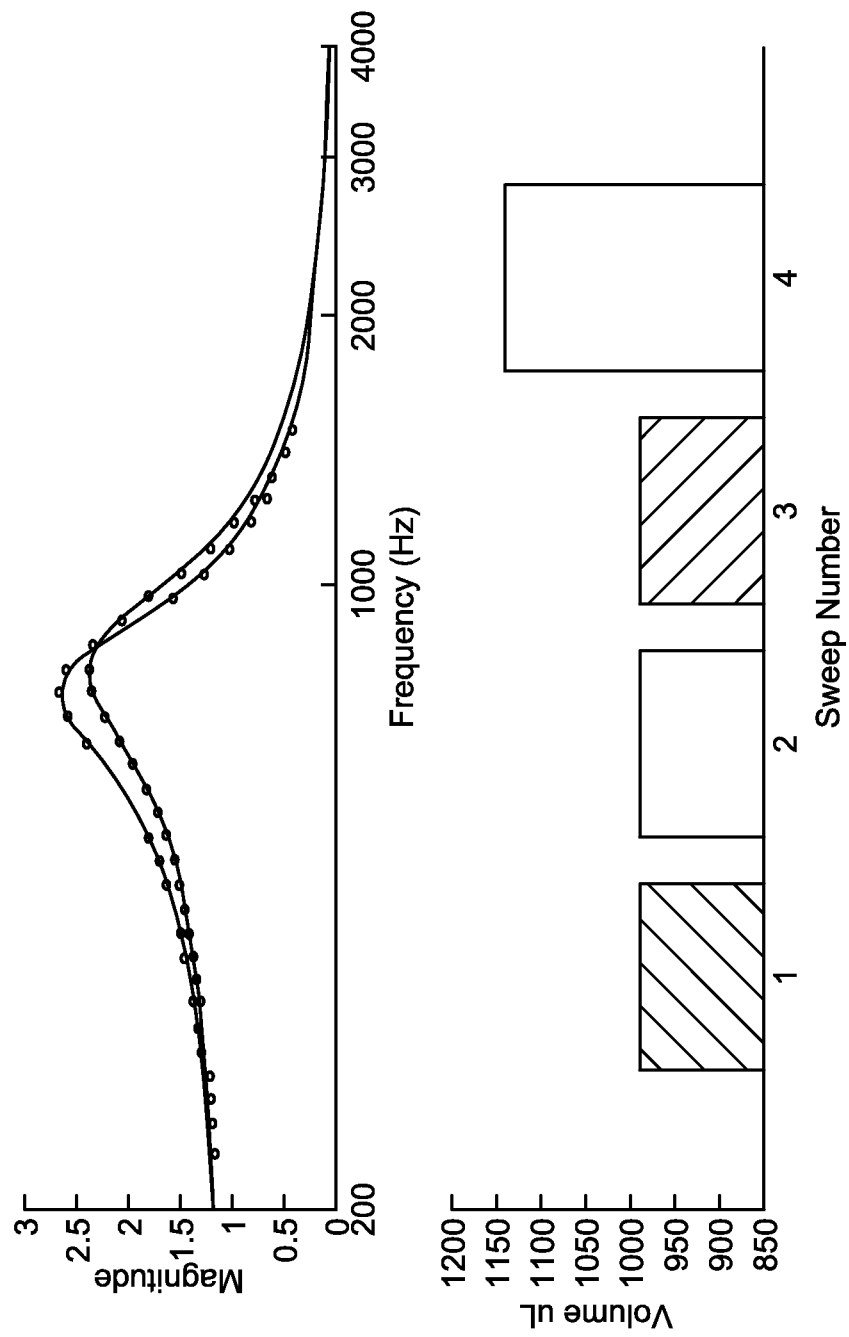


Fig. 180

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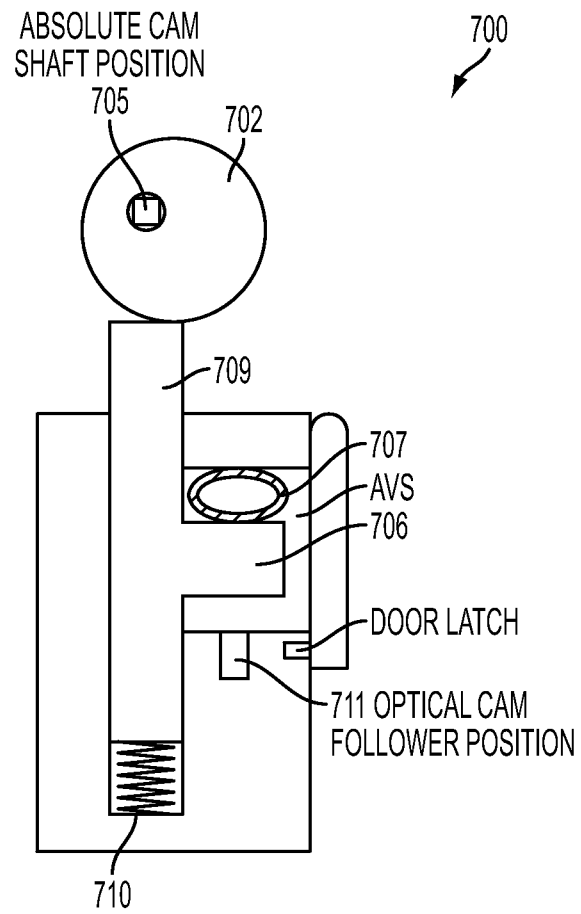


FIG. 181

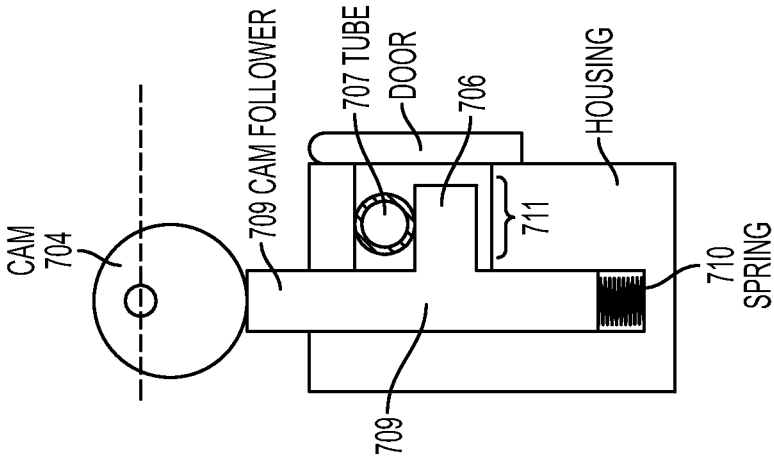


FIG. 182A

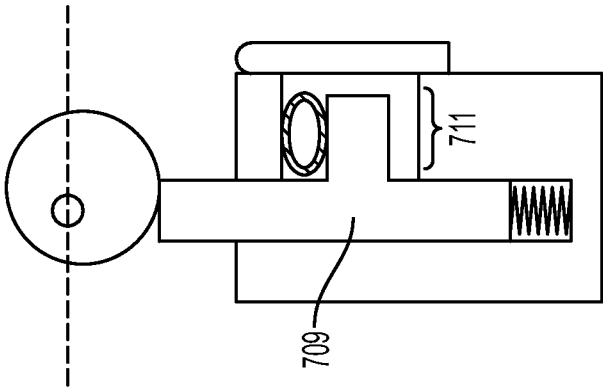


FIG. 182B

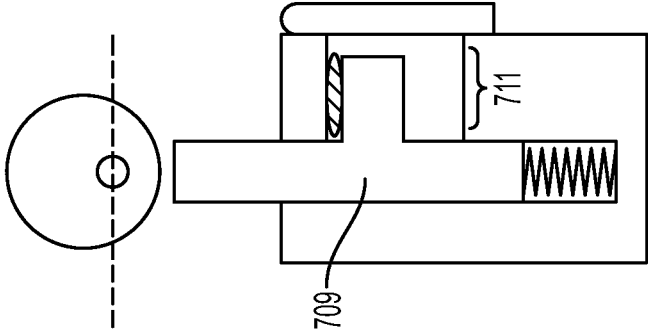


FIG. 182C

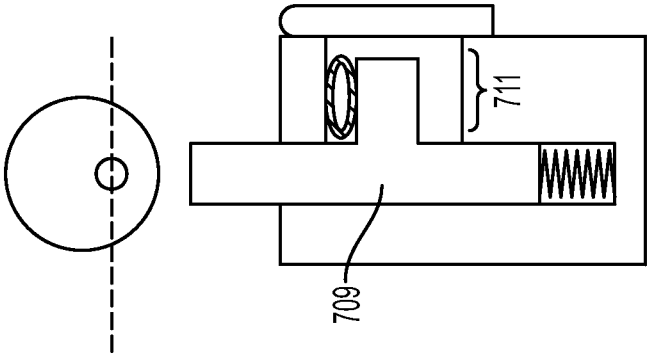


FIG. 183A

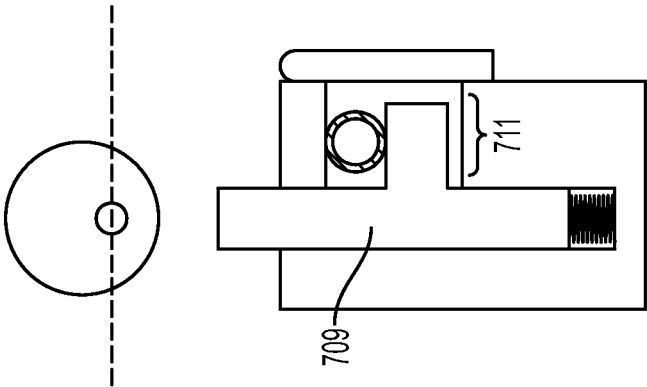


FIG. 183B

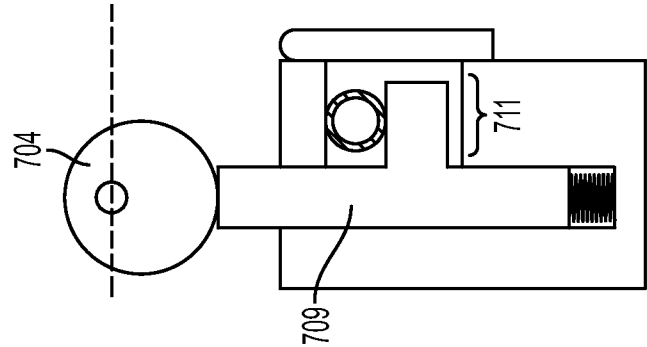


FIG. 183C

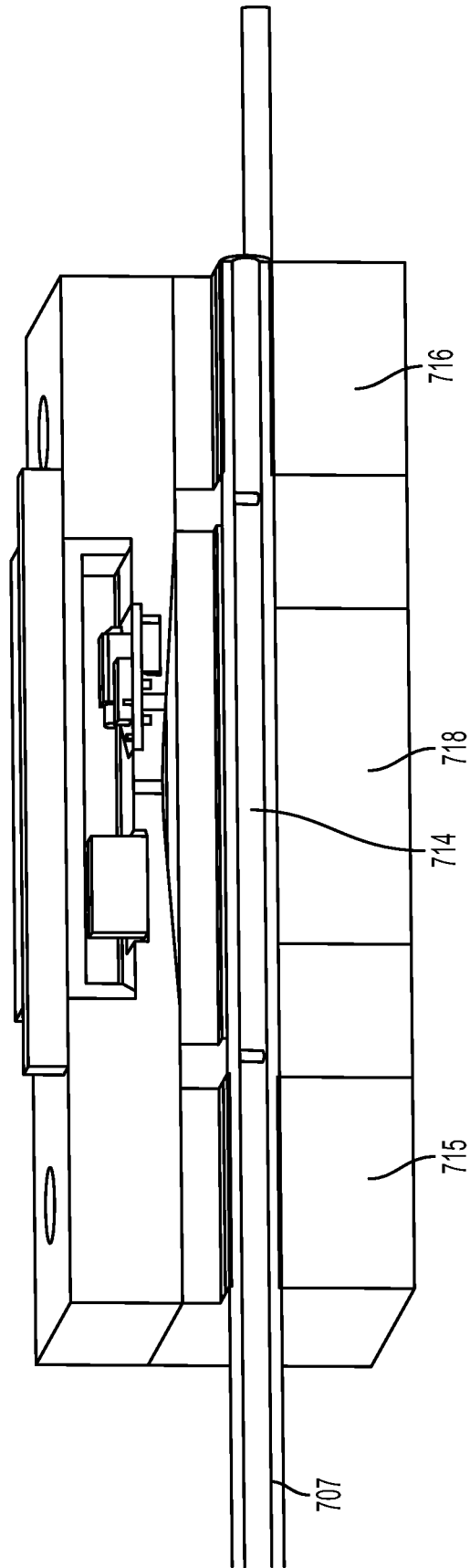
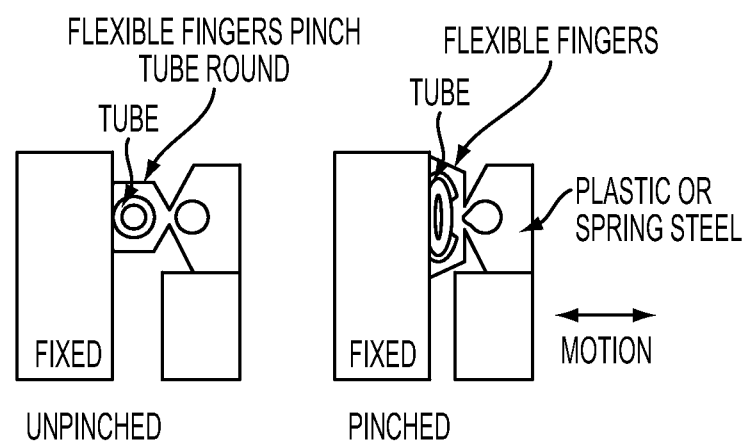


FIG. 184

**FIG. 185**

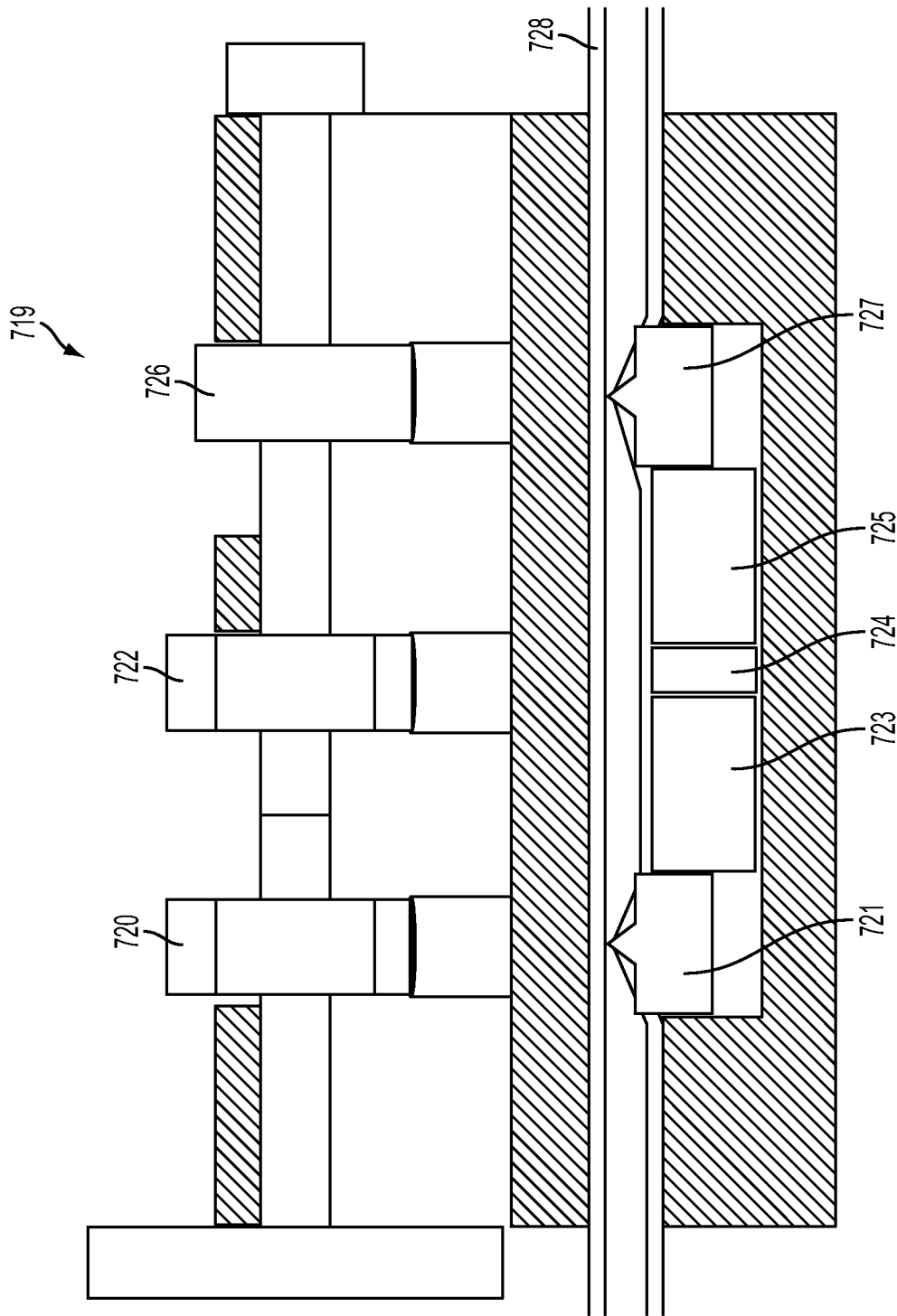


FIG. 186

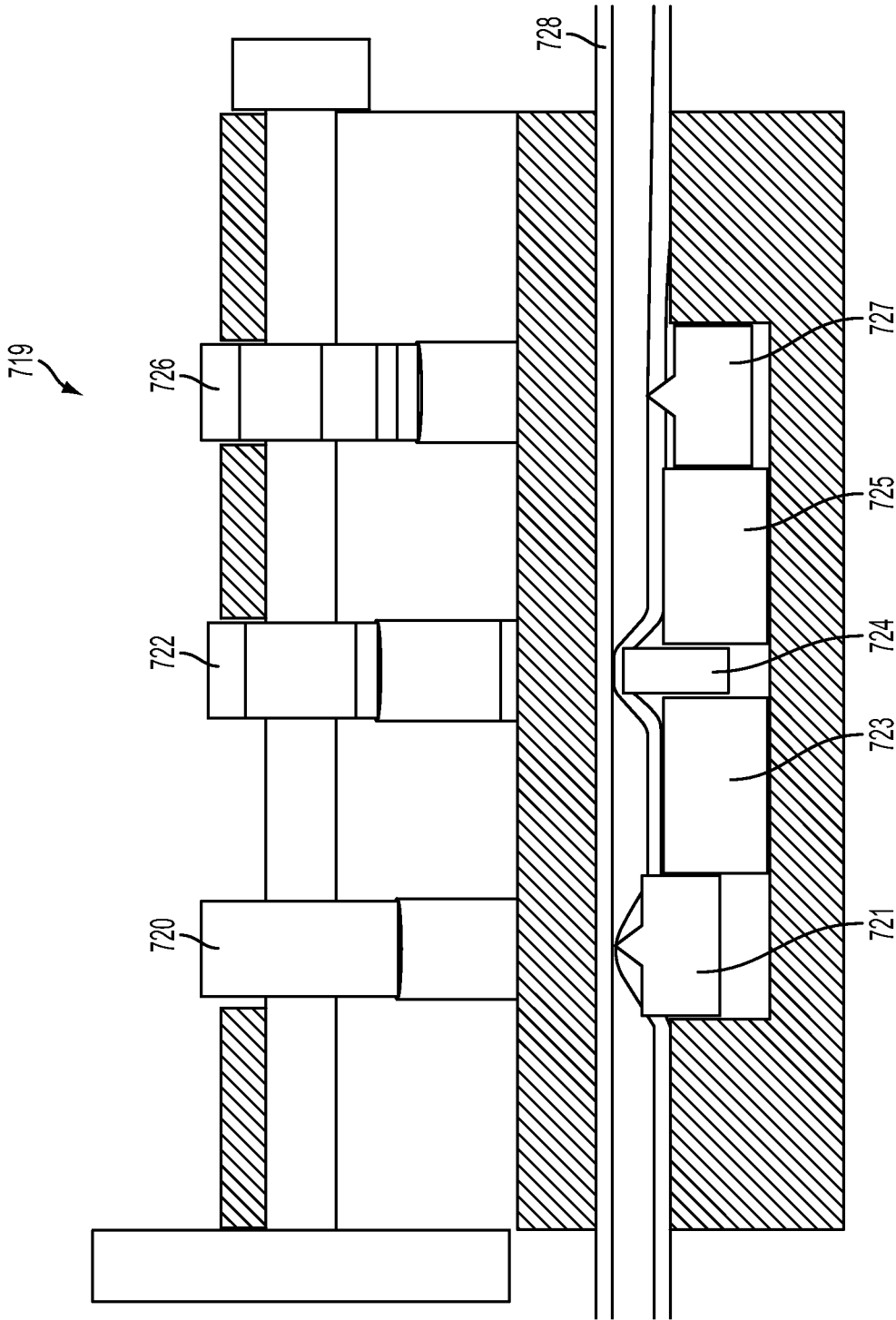


FIG. 187

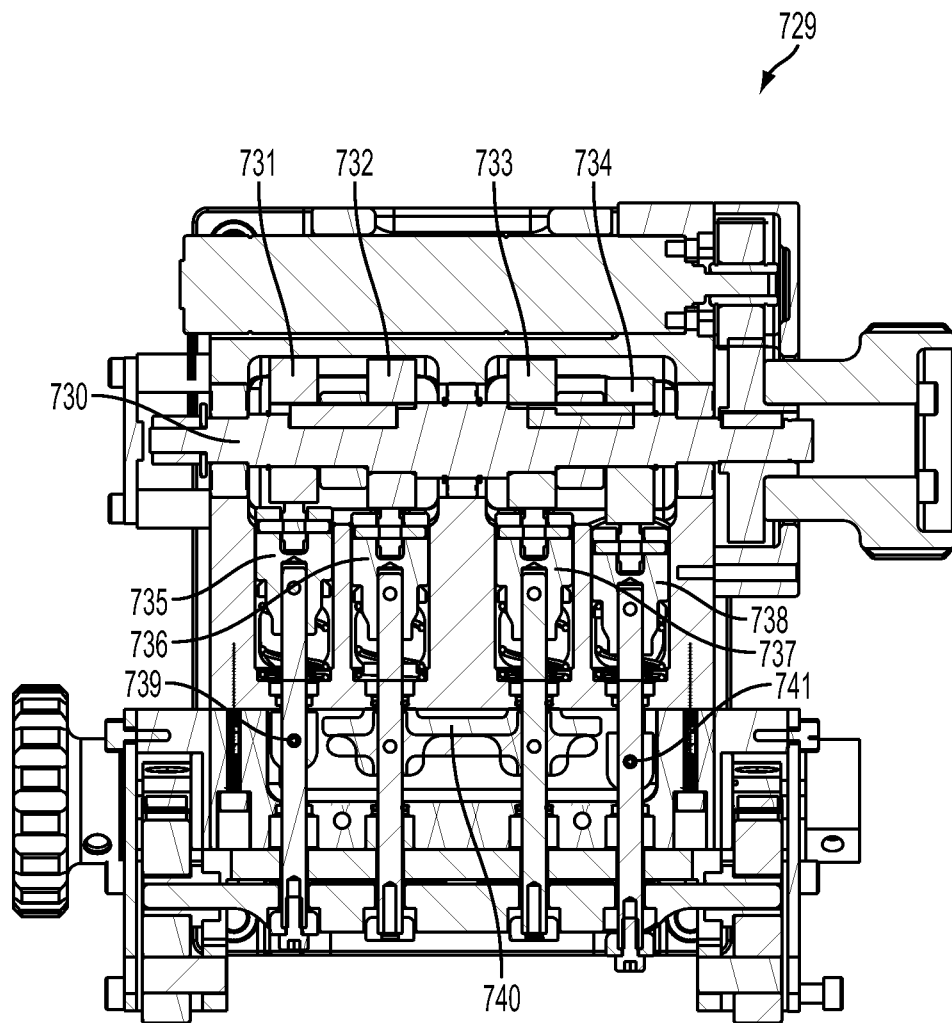


FIG. 188

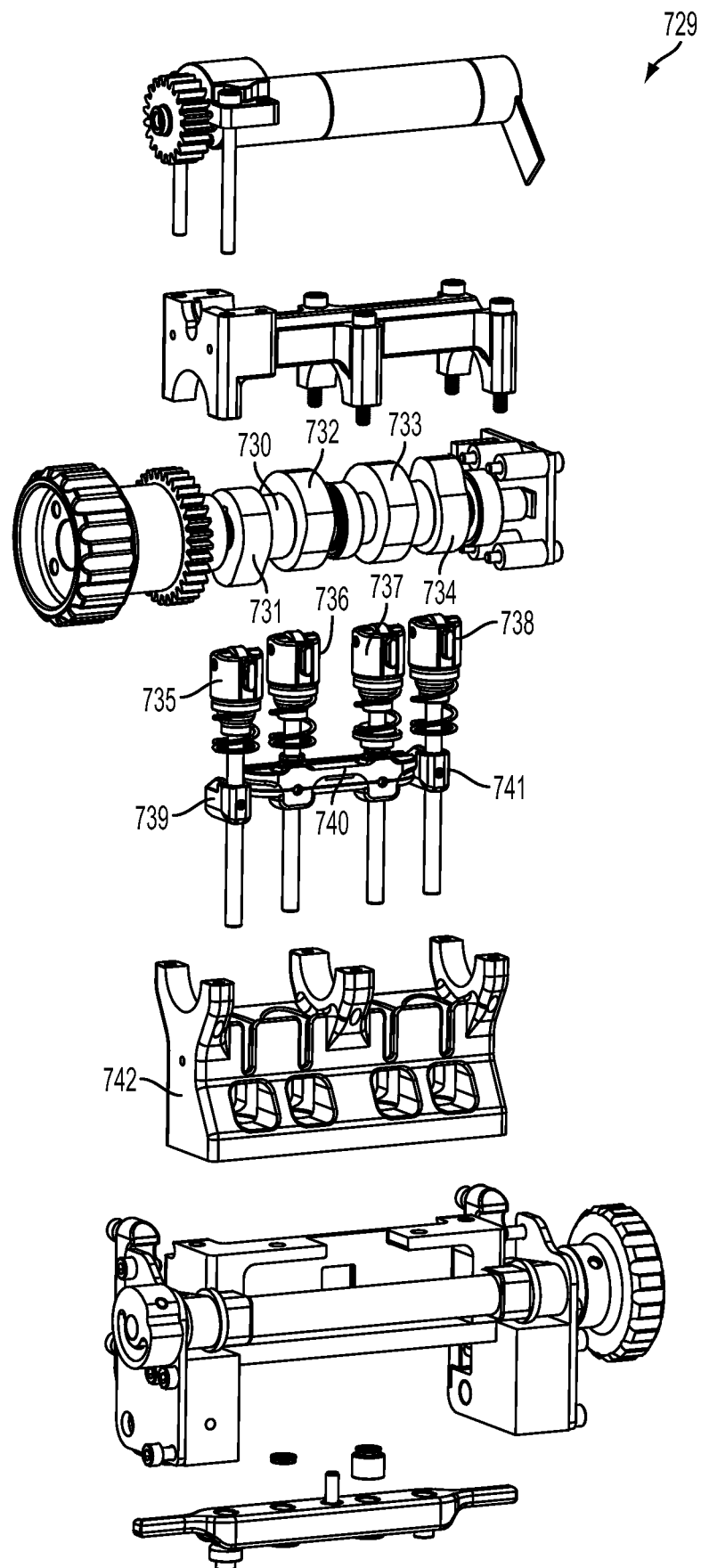


FIG. 189

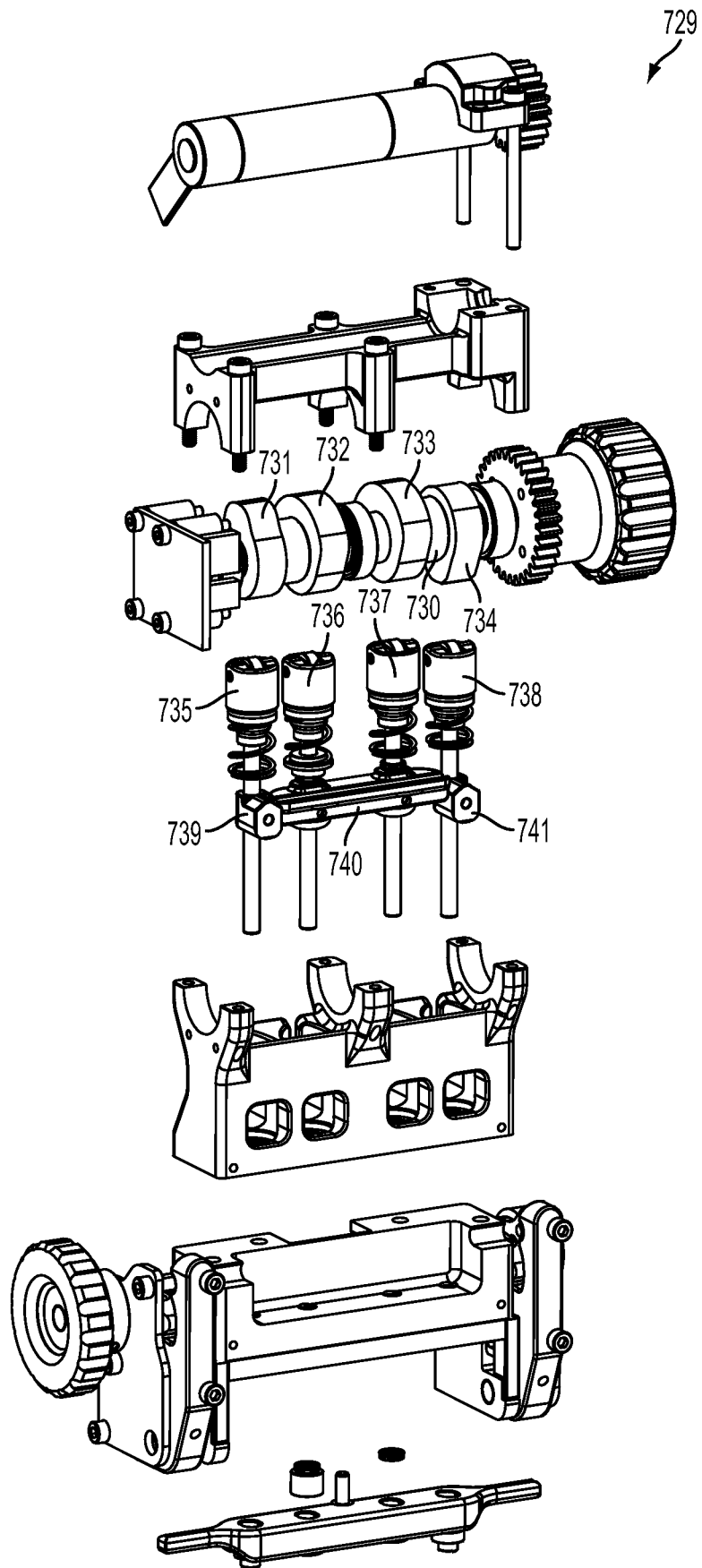


FIG. 190A

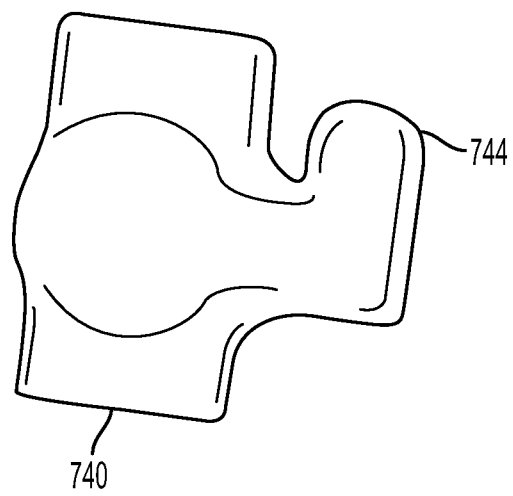
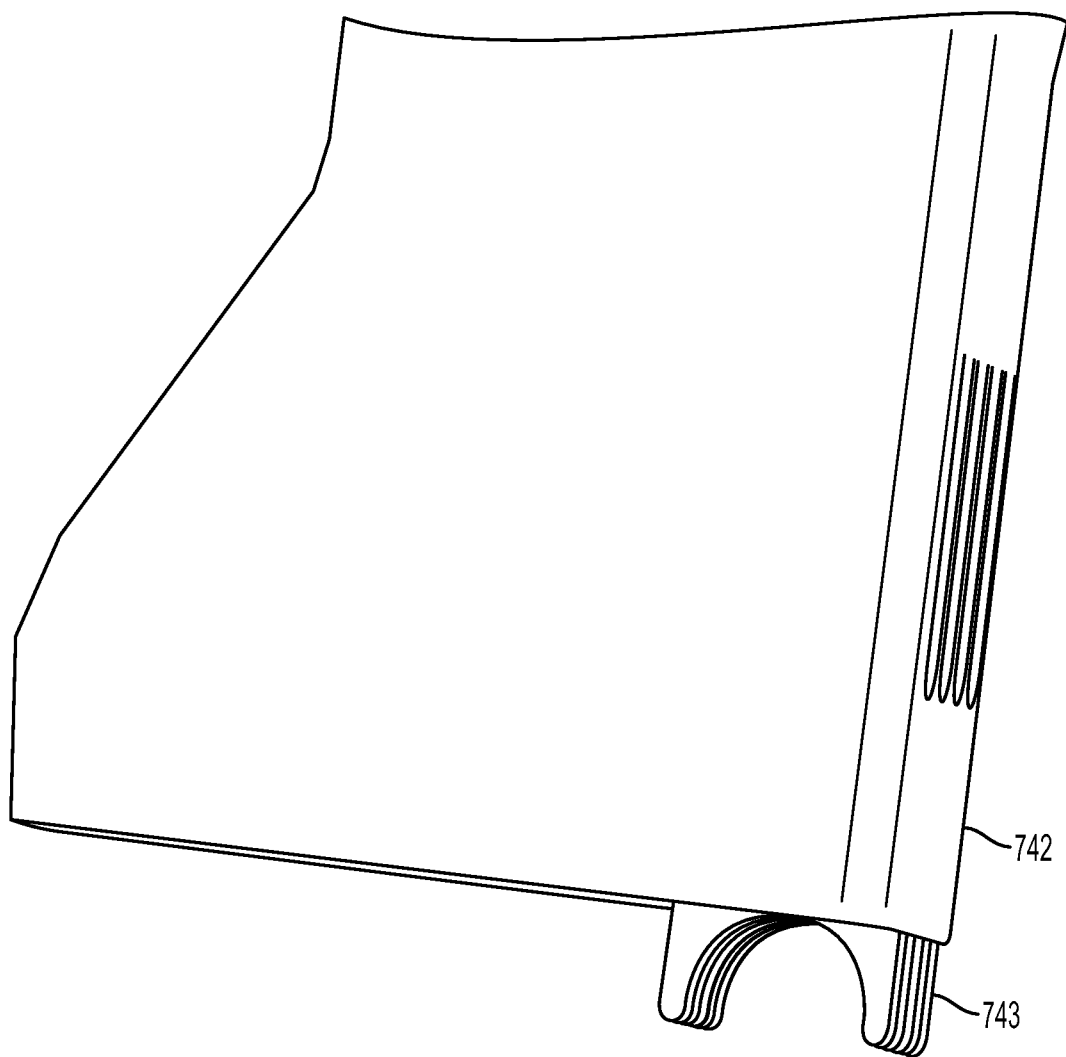


FIG. 190B

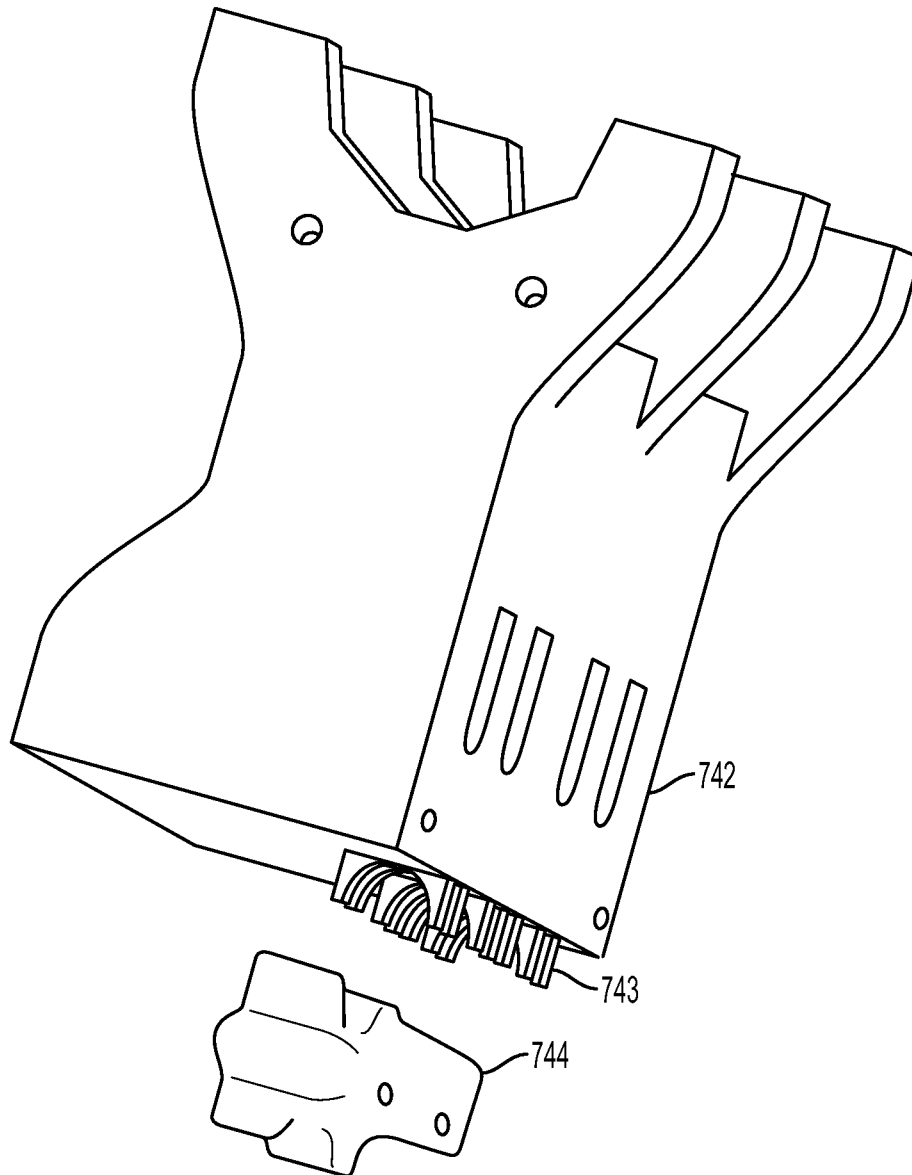


FIG. 190C

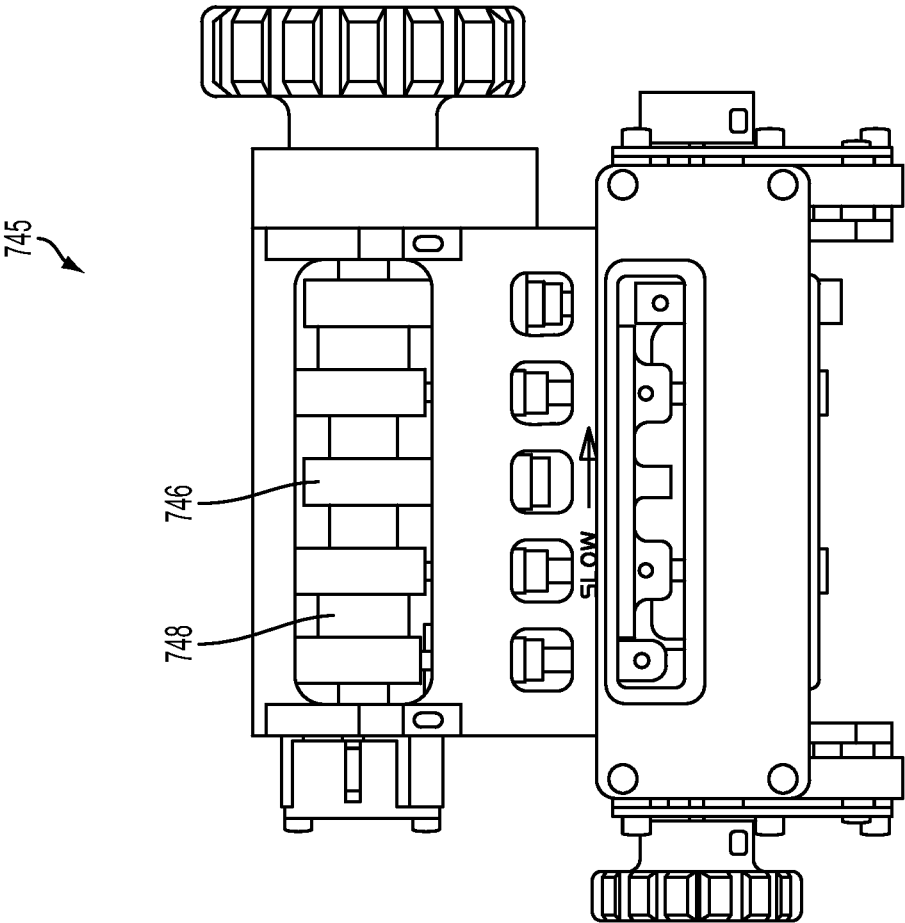


FIG. 192

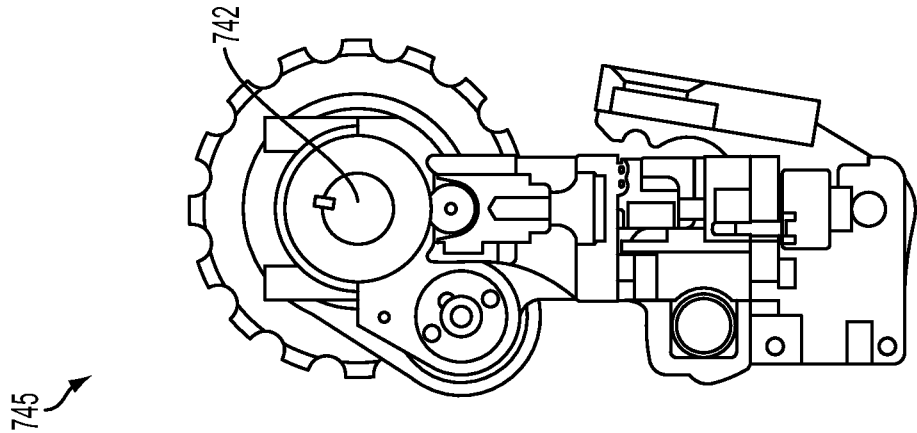


FIG. 191

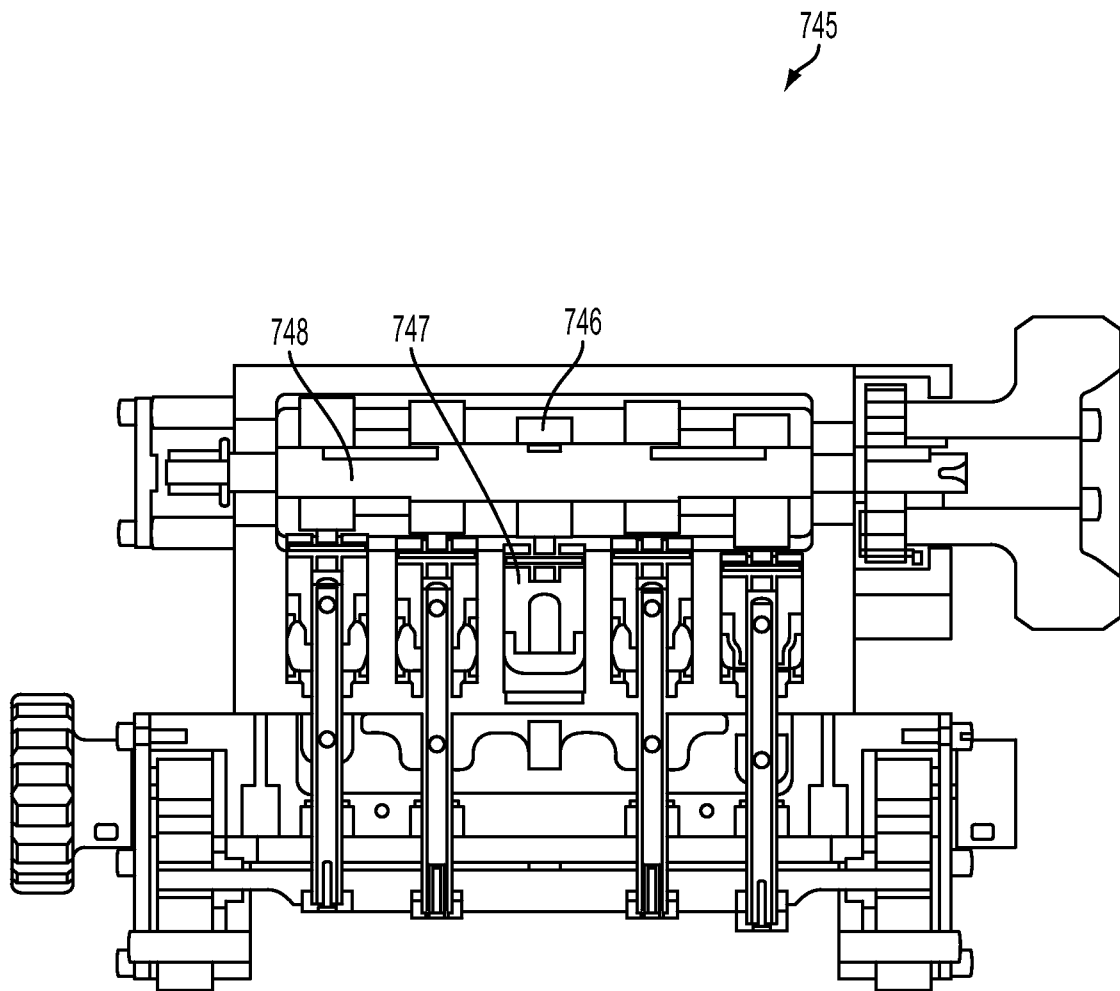


FIG. 193

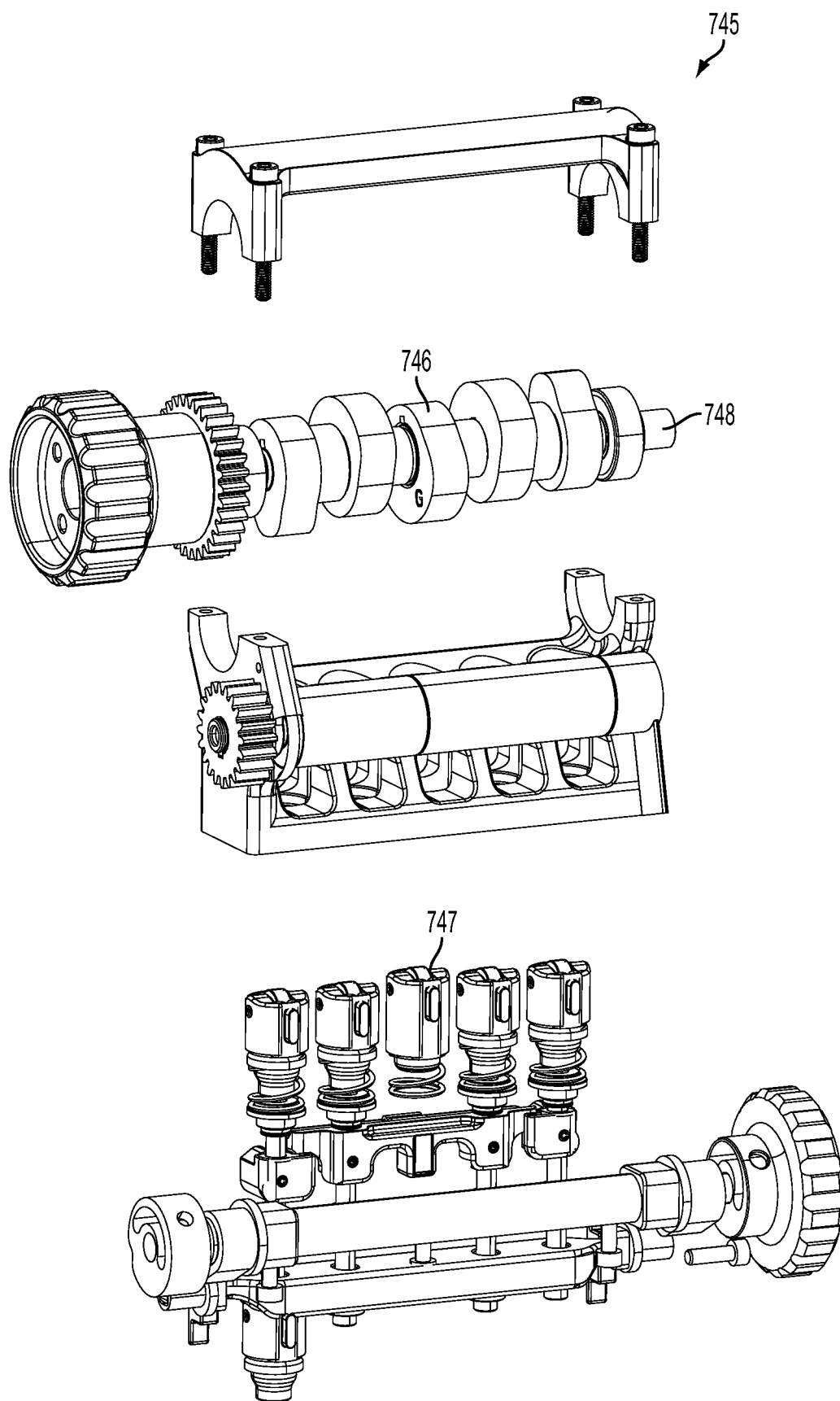


FIG. 194

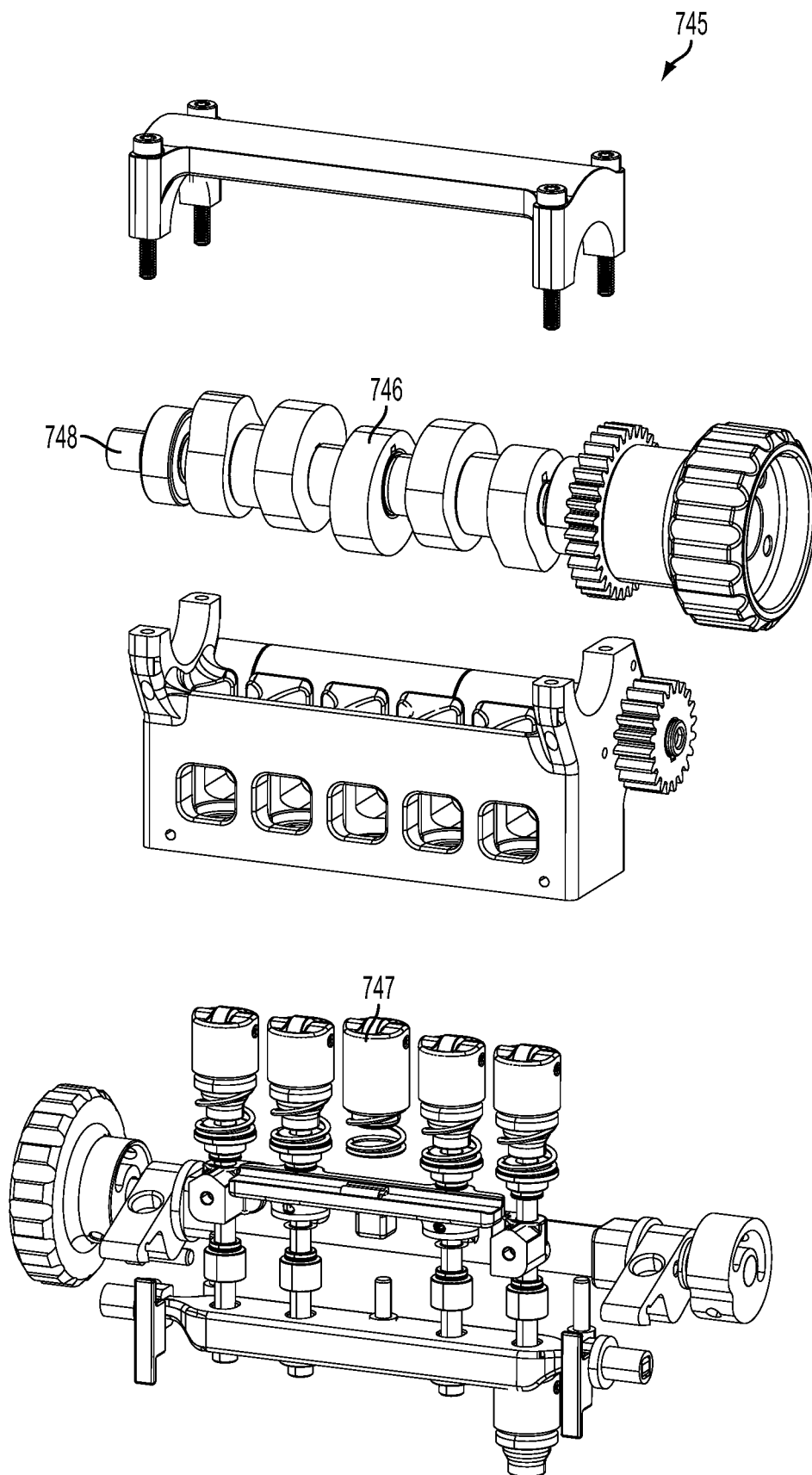


FIG. 195

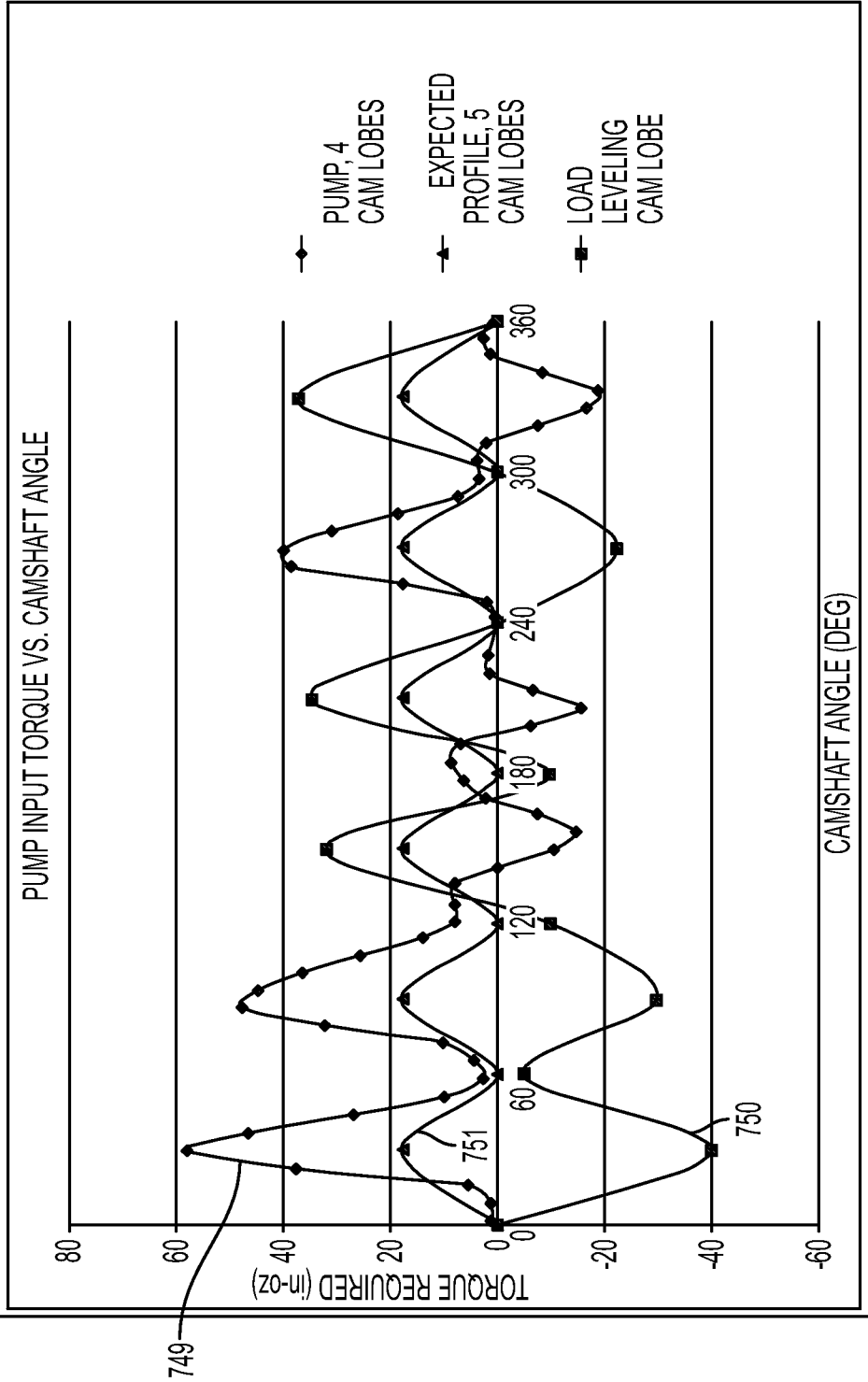


FIG. 196A

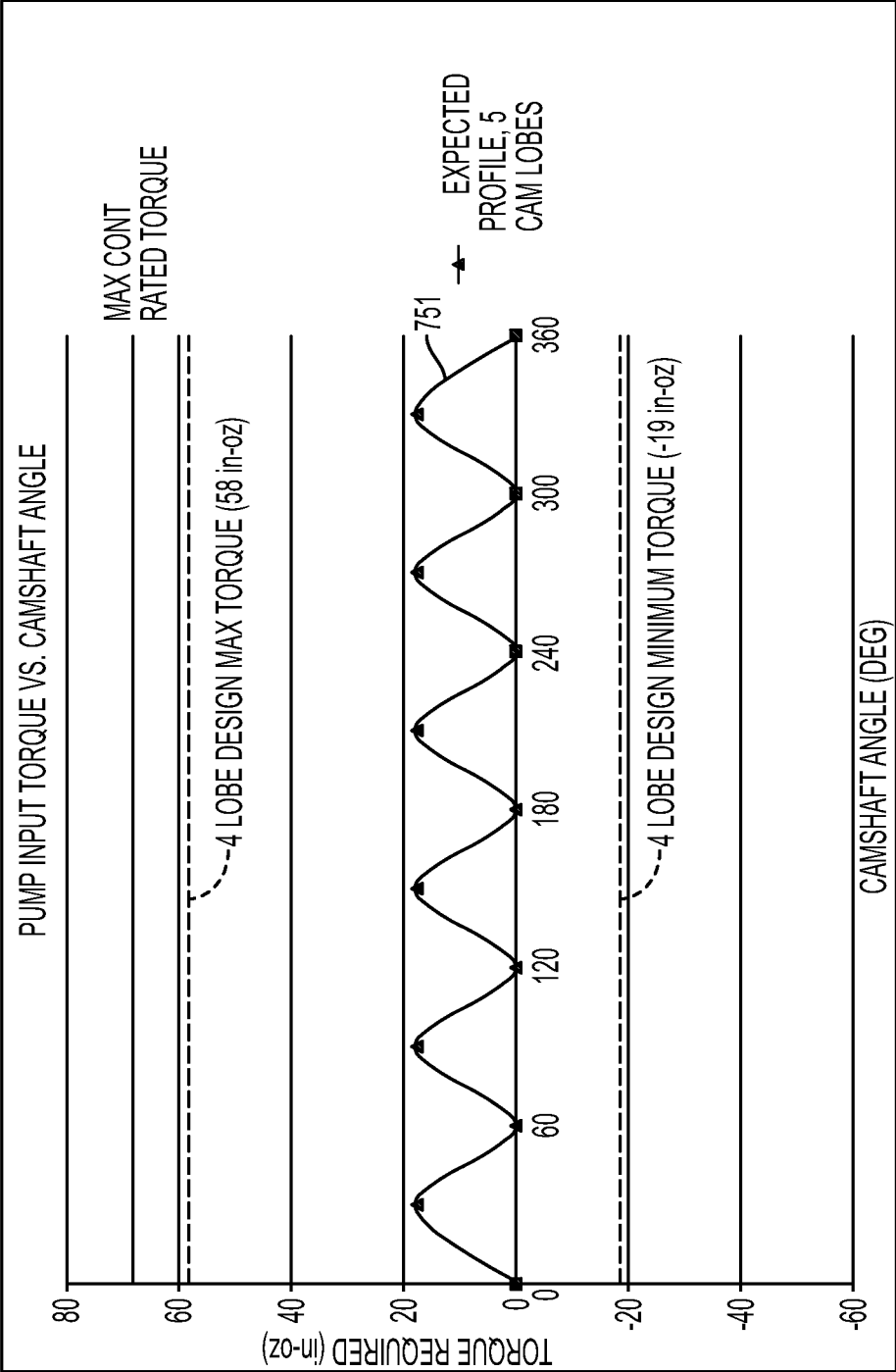


FIG. 196B

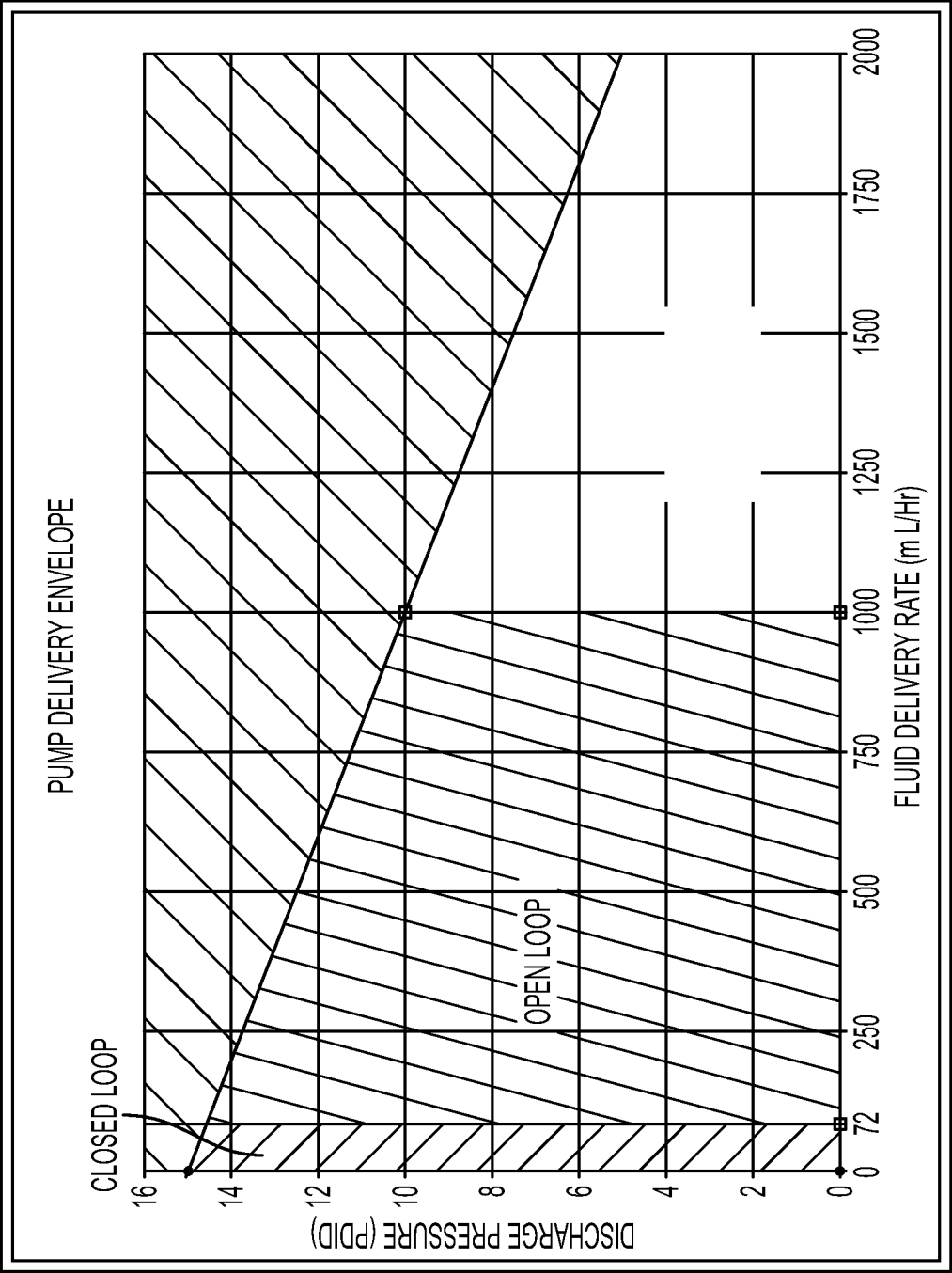


FIG. 198

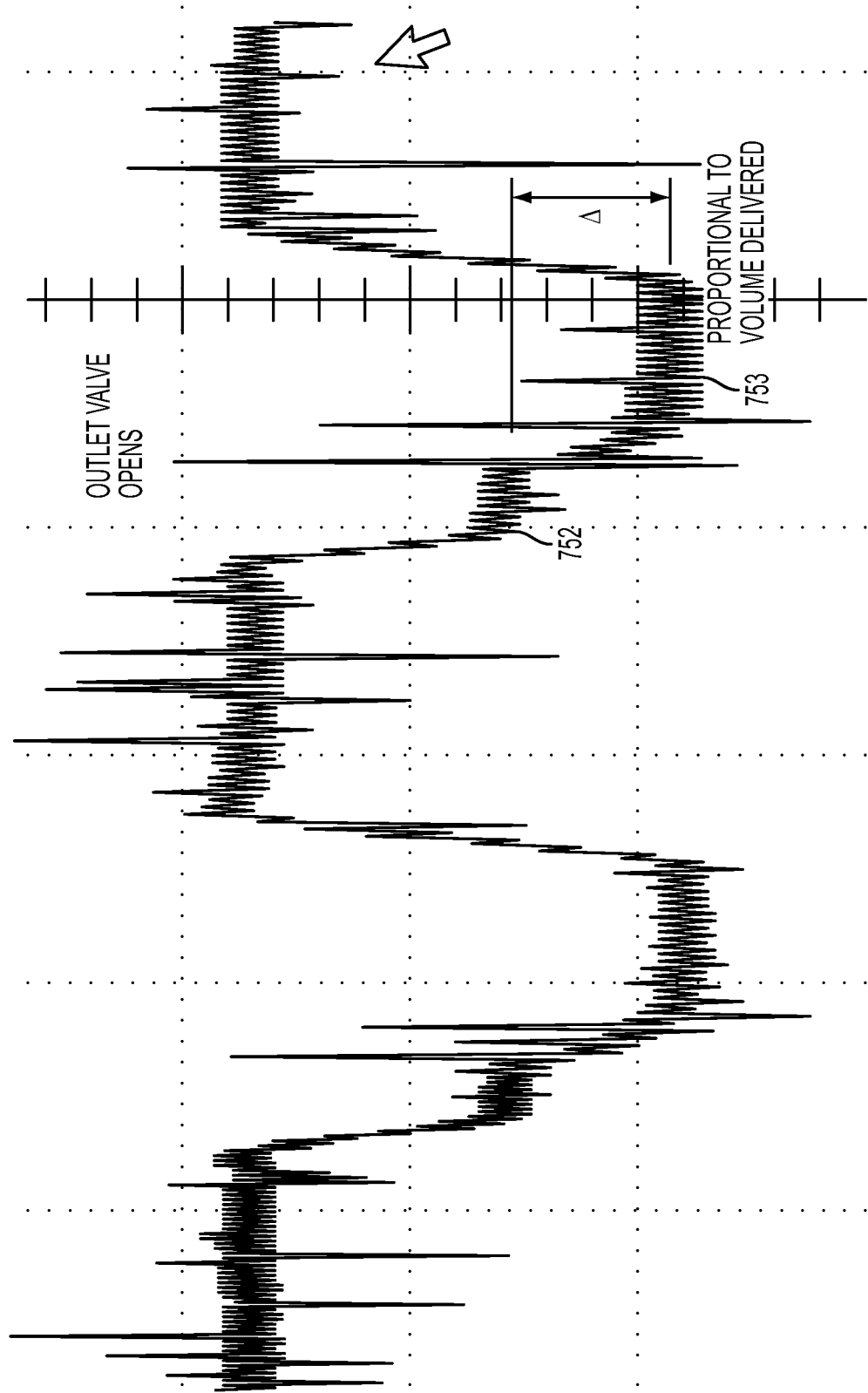


FIG. 199

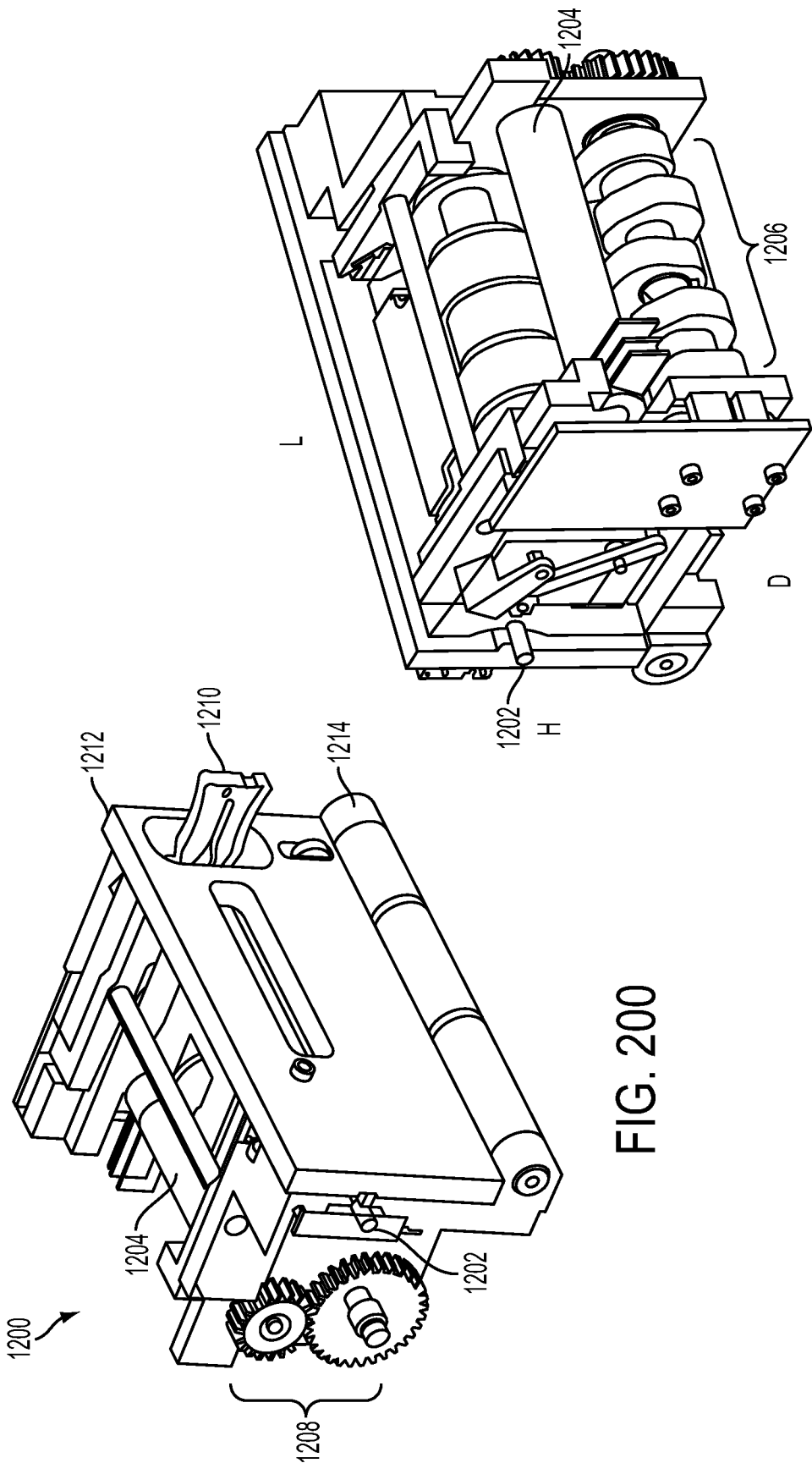


FIG. 201

FIG. 200

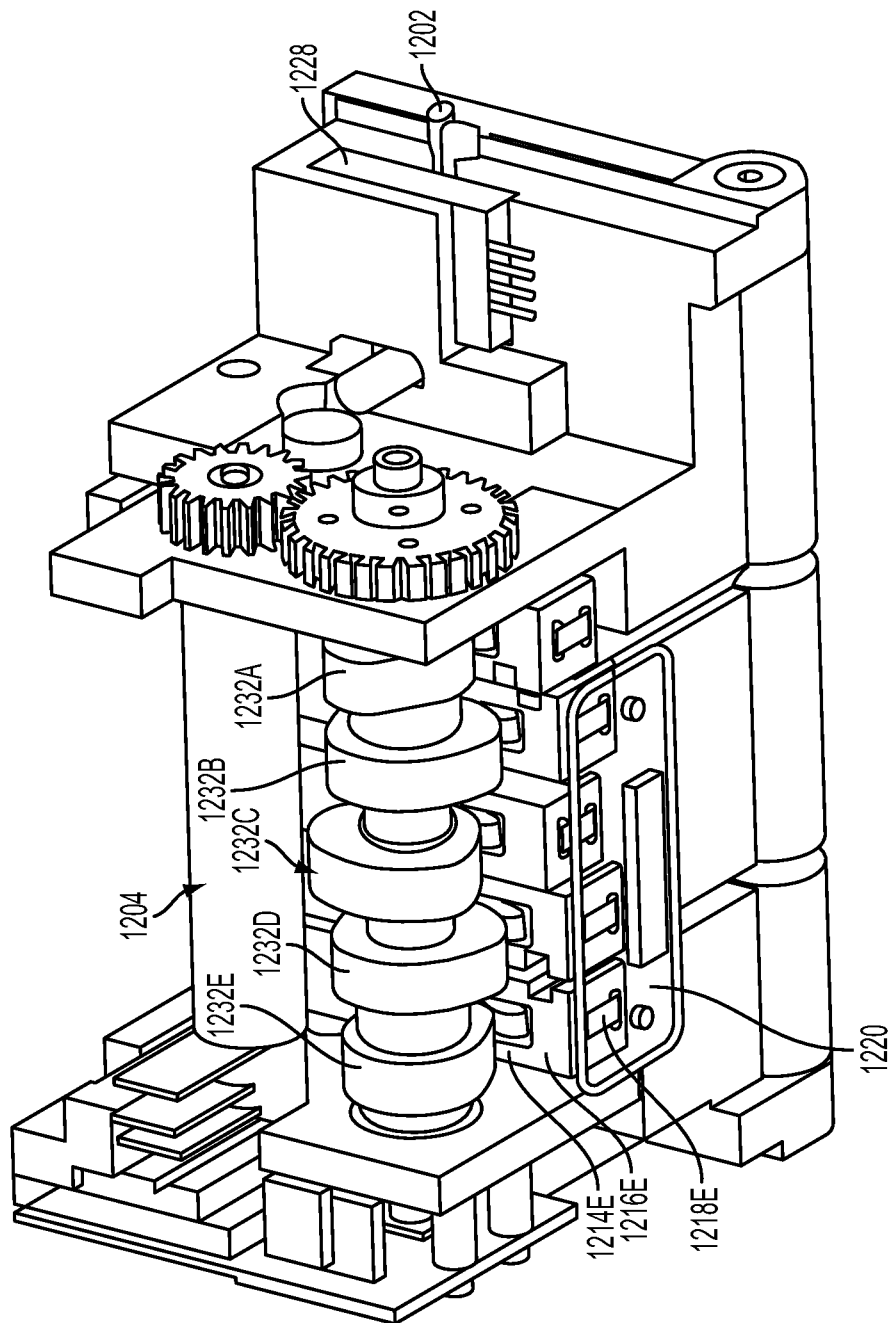


FIG. 202

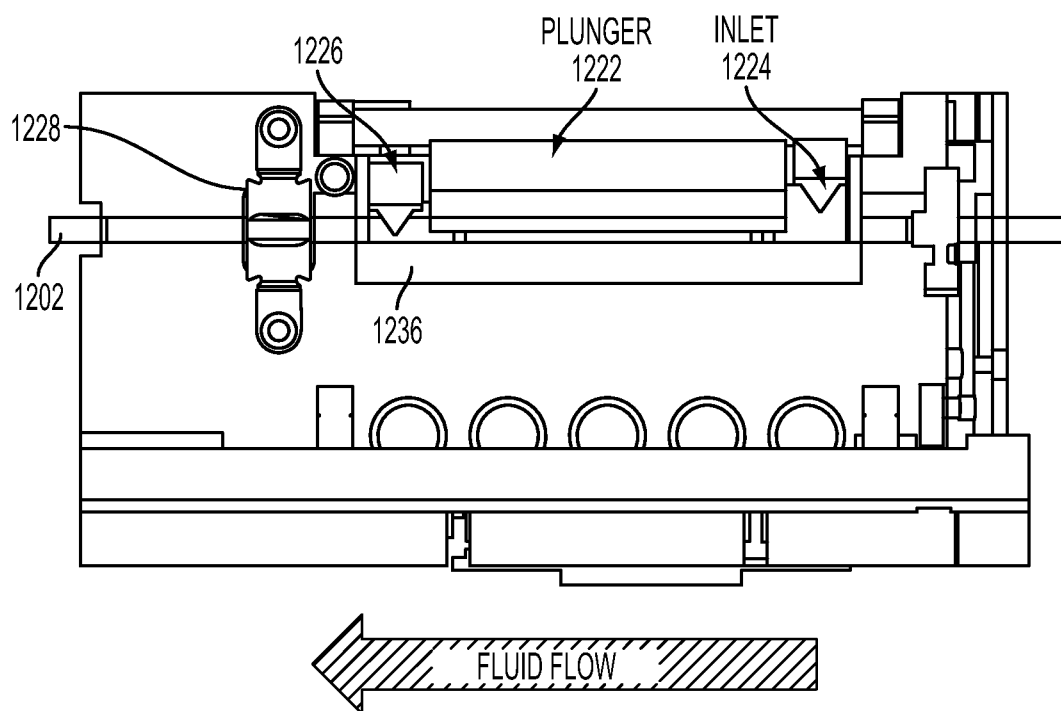


FIG. 203

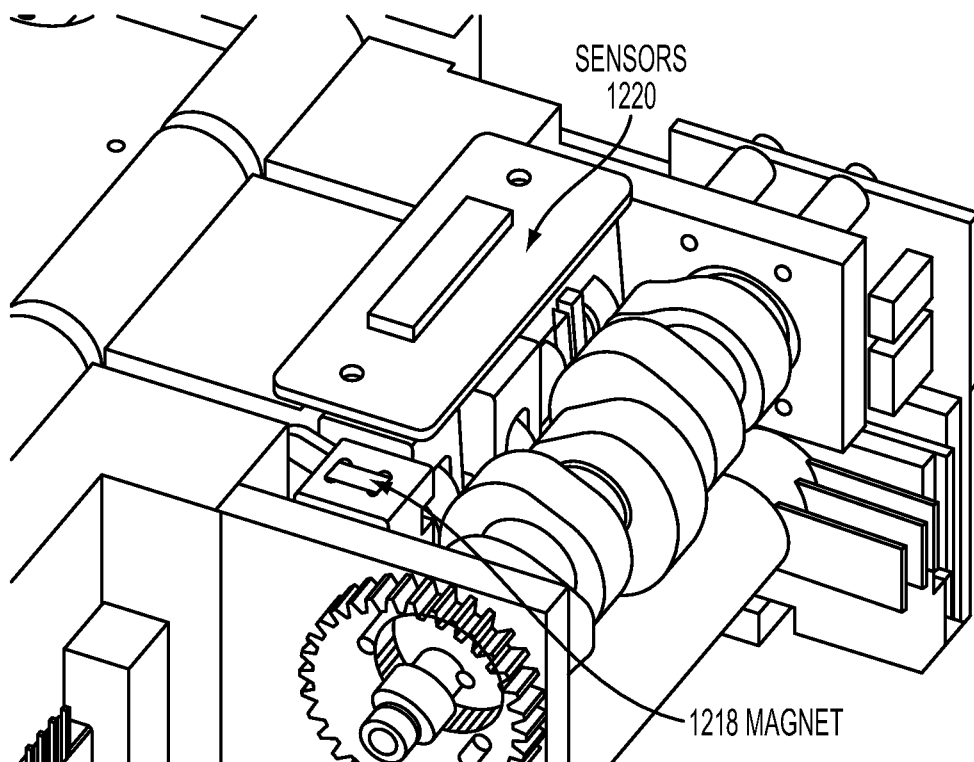


FIG. 204

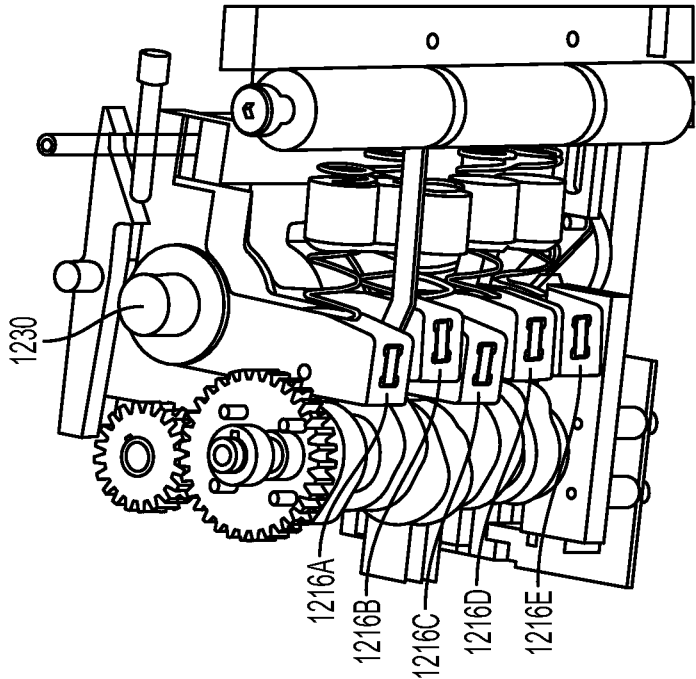


FIG. 205

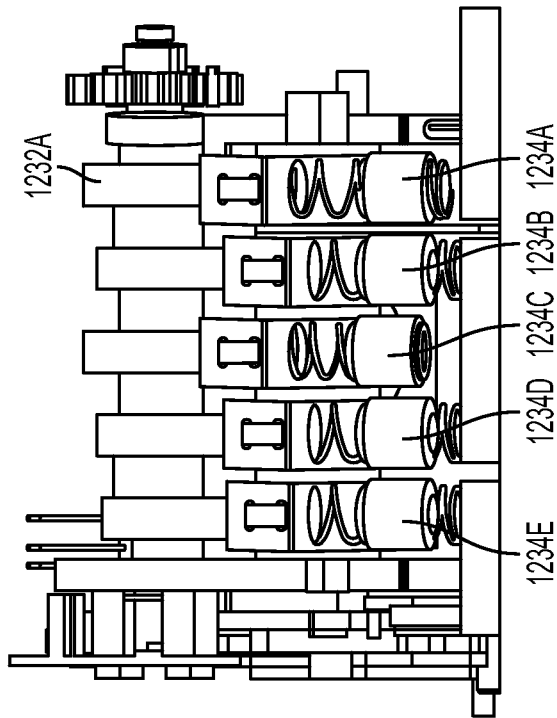


FIG. 206

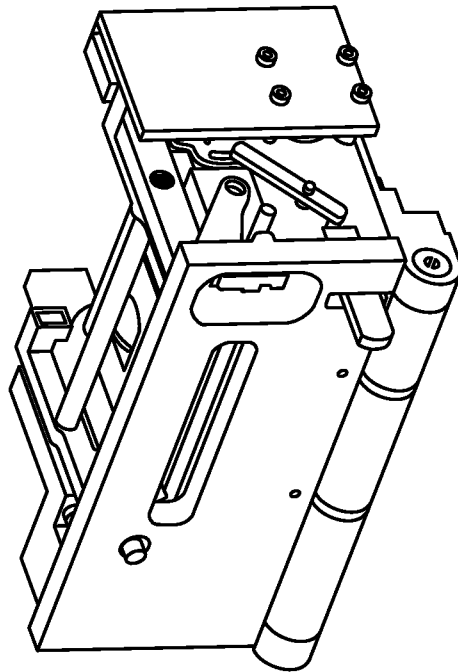


FIG. 208

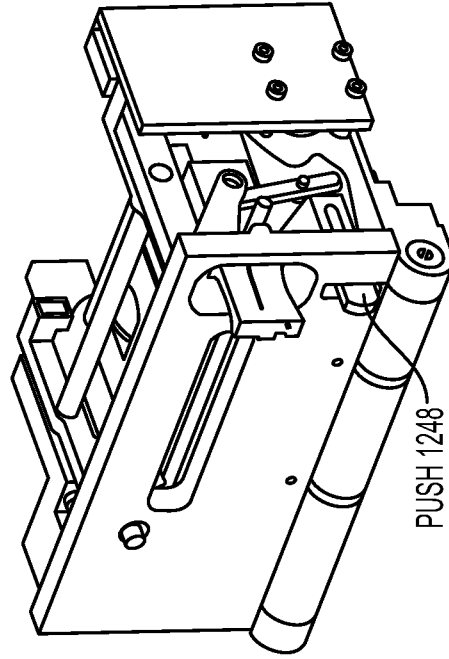


FIG. 209

SLIDE CLAMP KEY

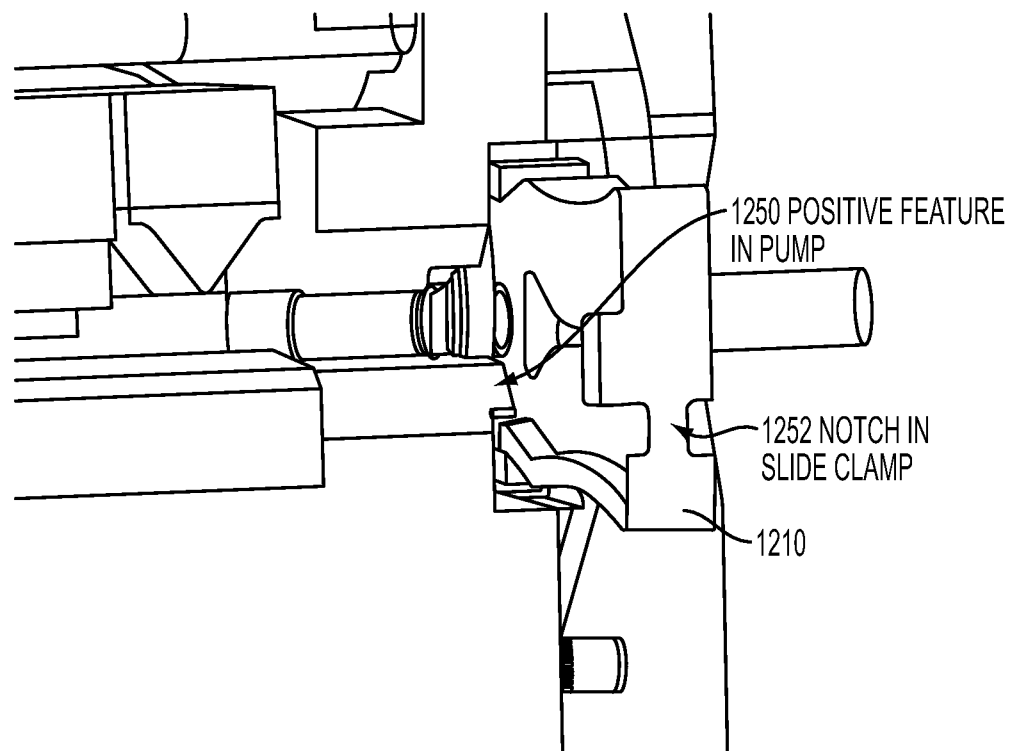
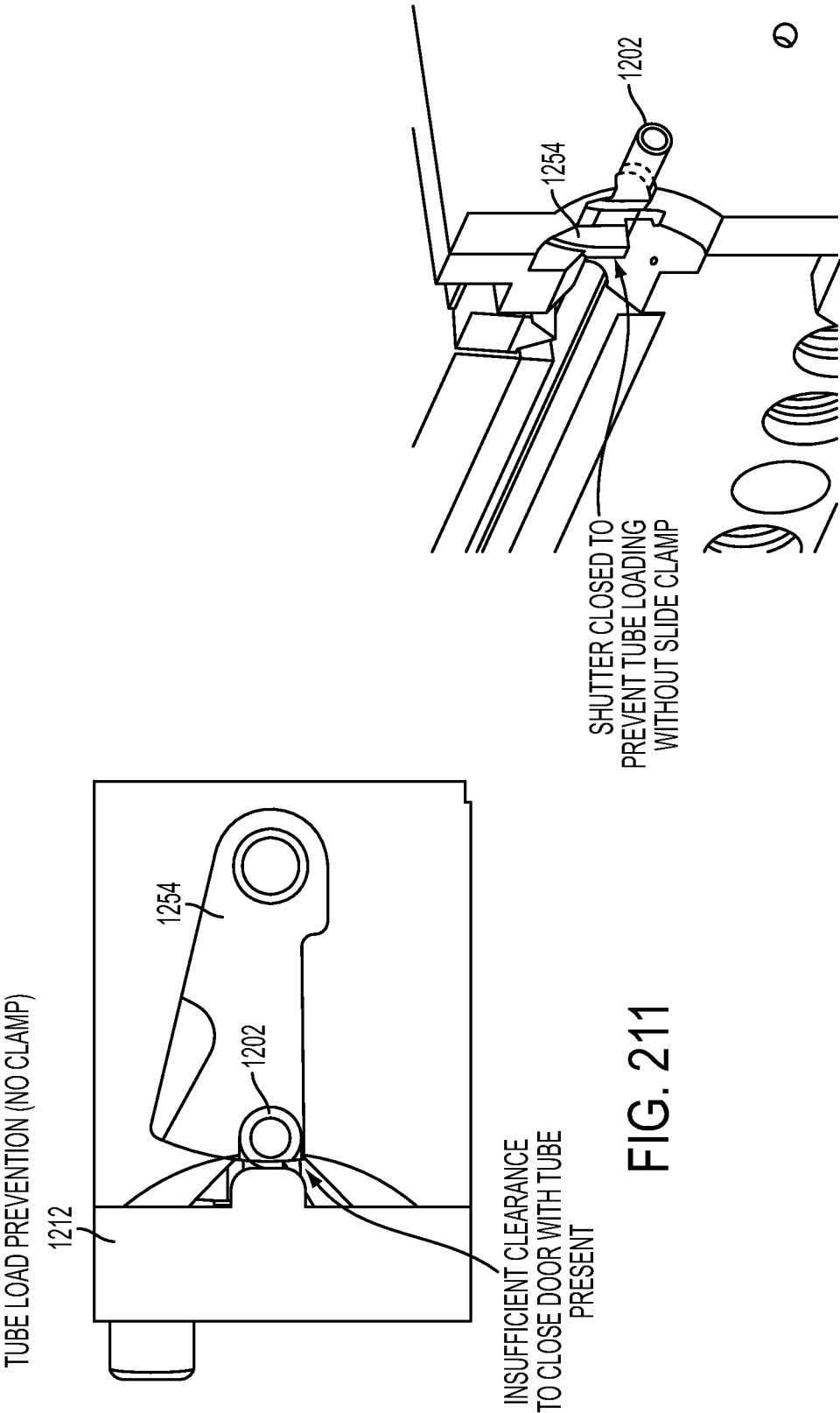


FIG. 210



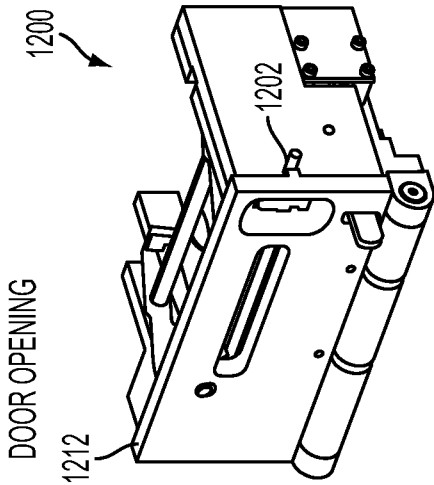


FIG. 213

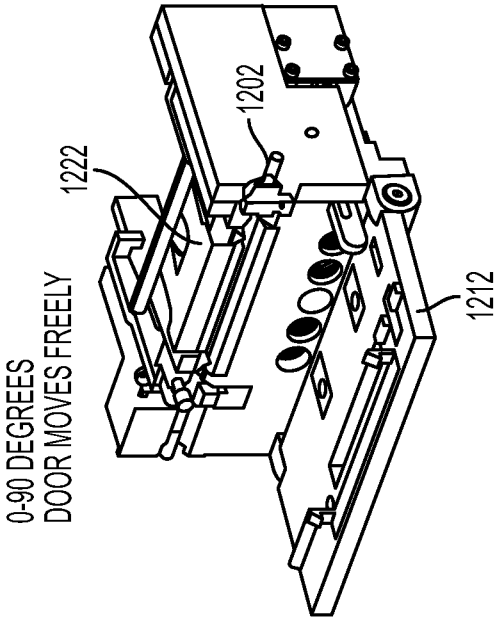


FIG. 214

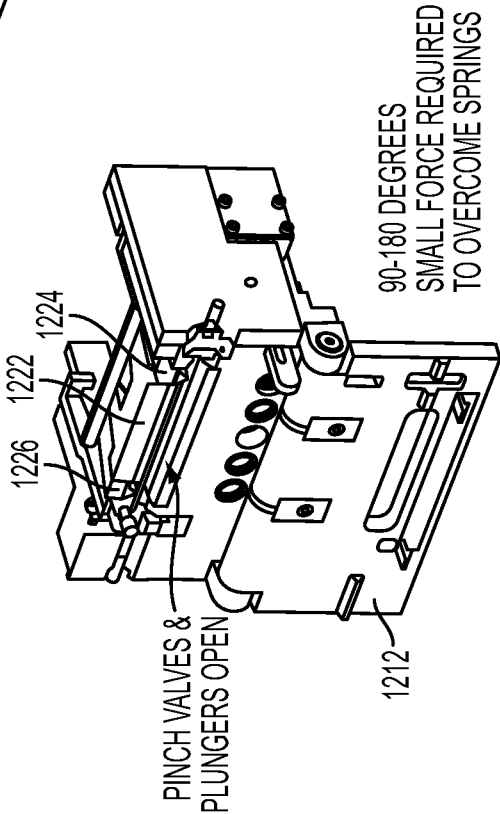


FIG. 215

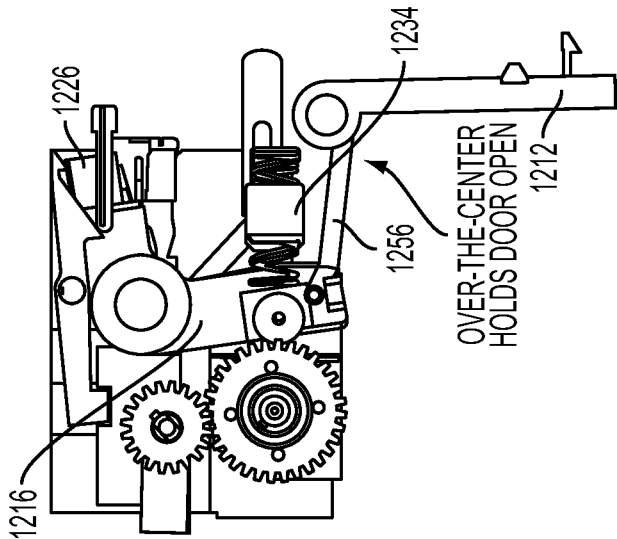


FIG. 218

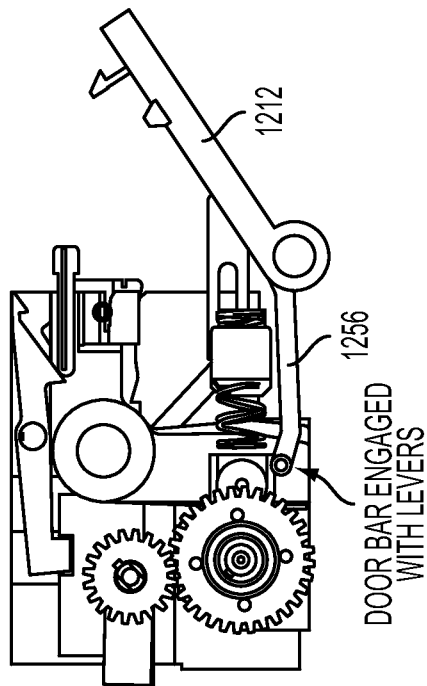


FIG. 217

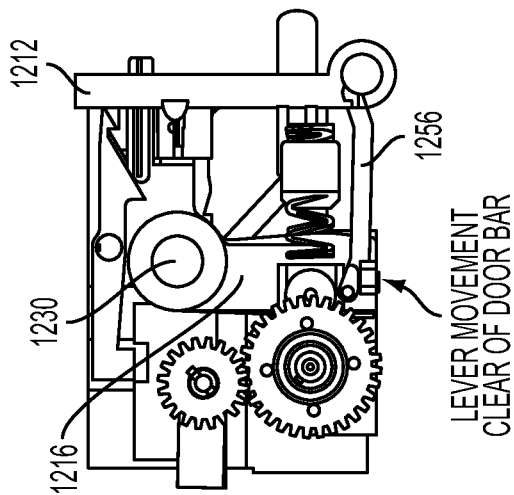


FIG. 216

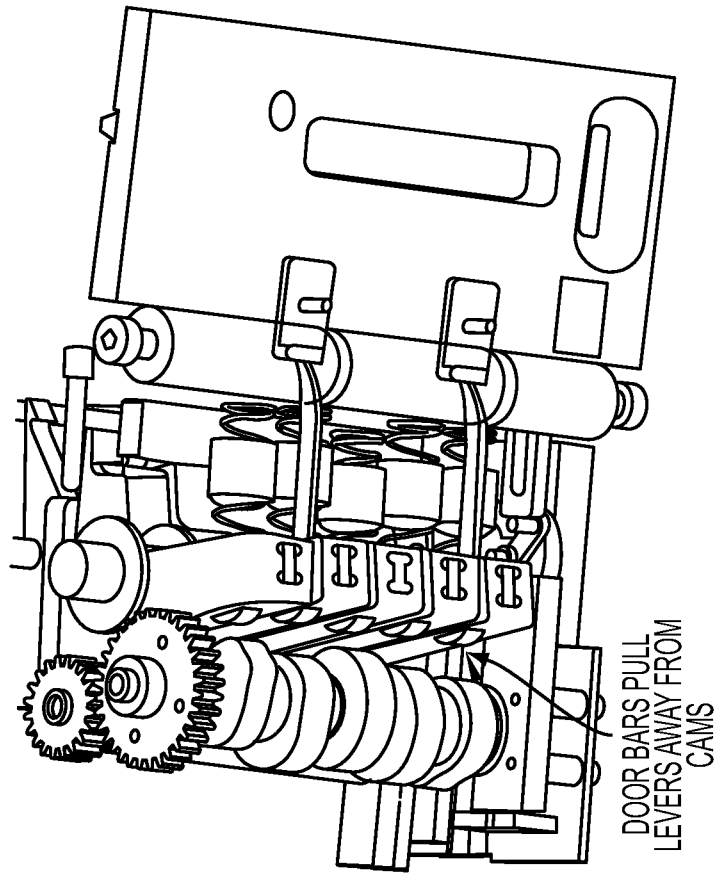


FIG. 220

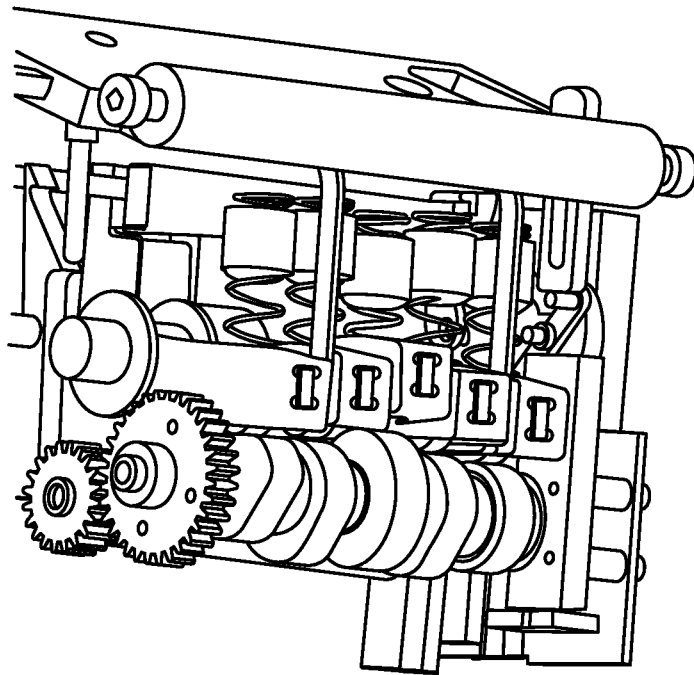


FIG. 219

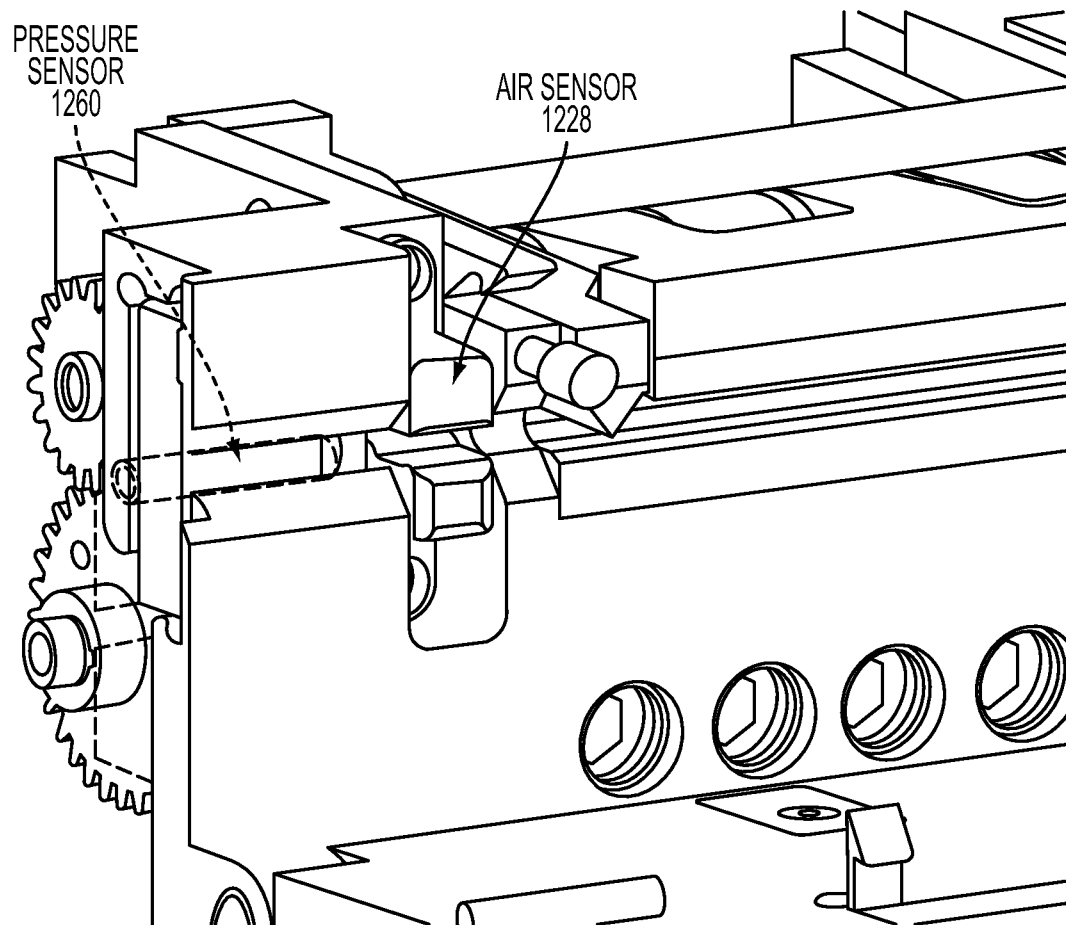


FIG. 221

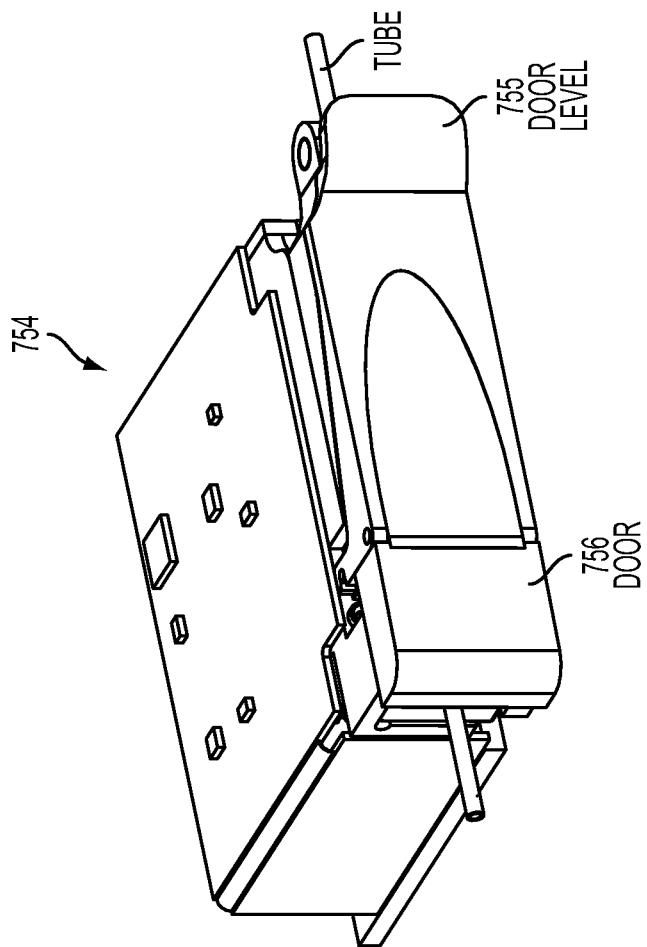


FIG. 222

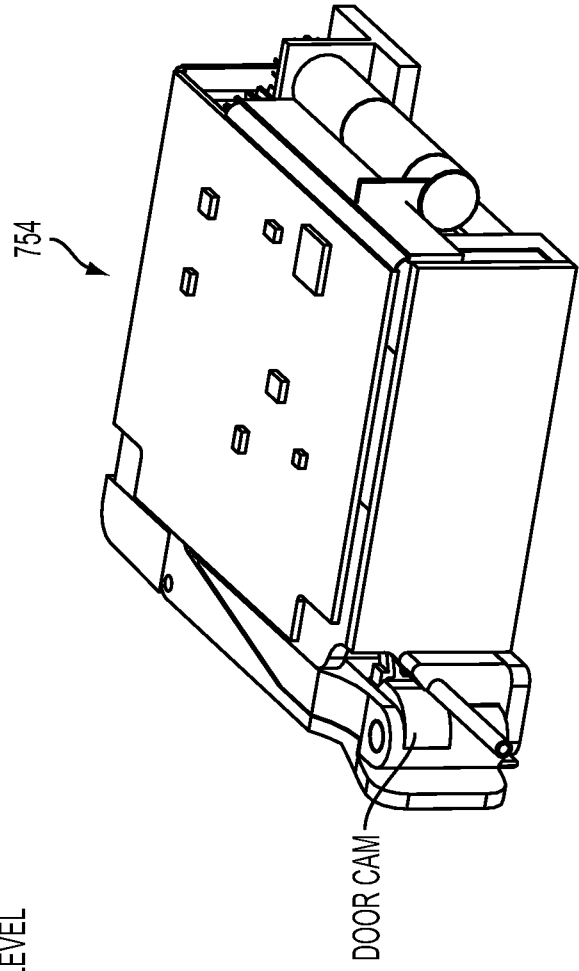


FIG. 223

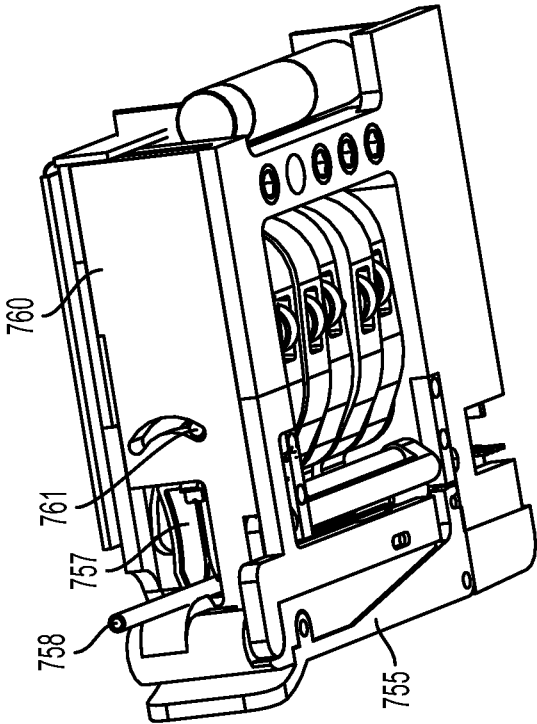


FIG. 224

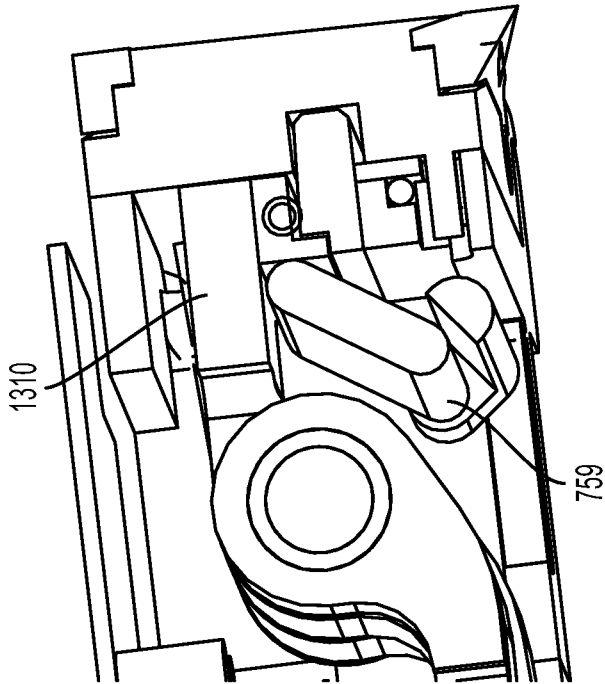


FIG. 225

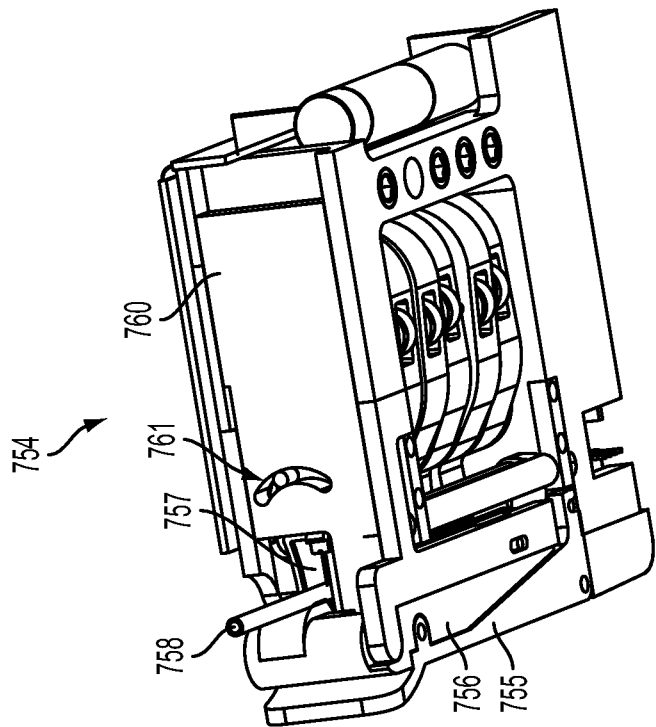
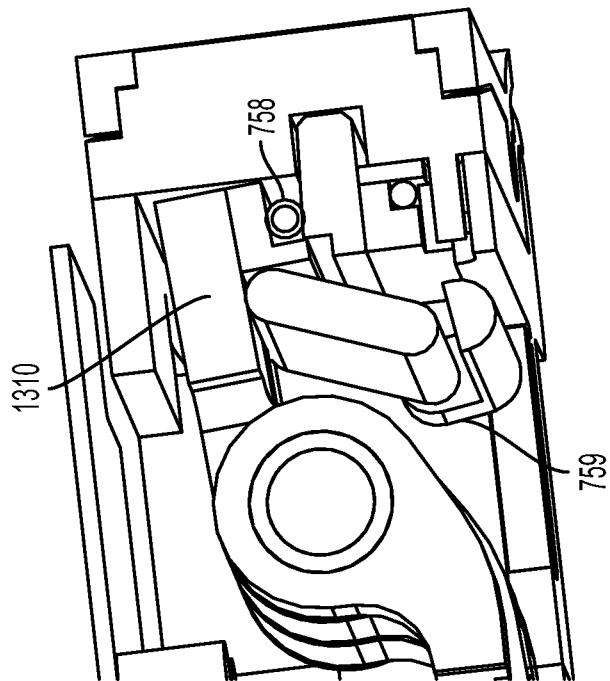


FIG. 226



PLUNGERS ENGAGED

FIG. 227

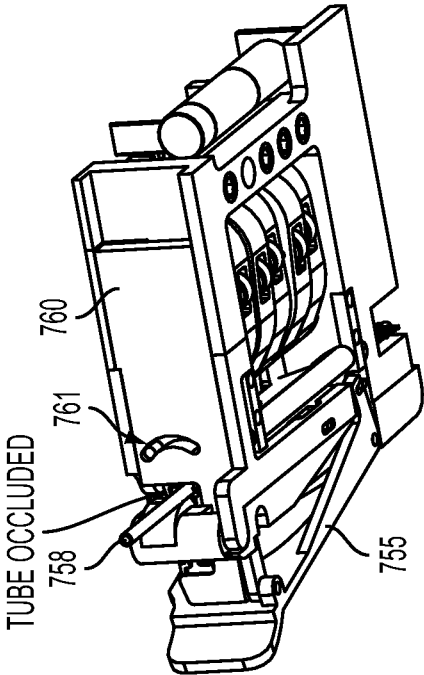


FIG. 228

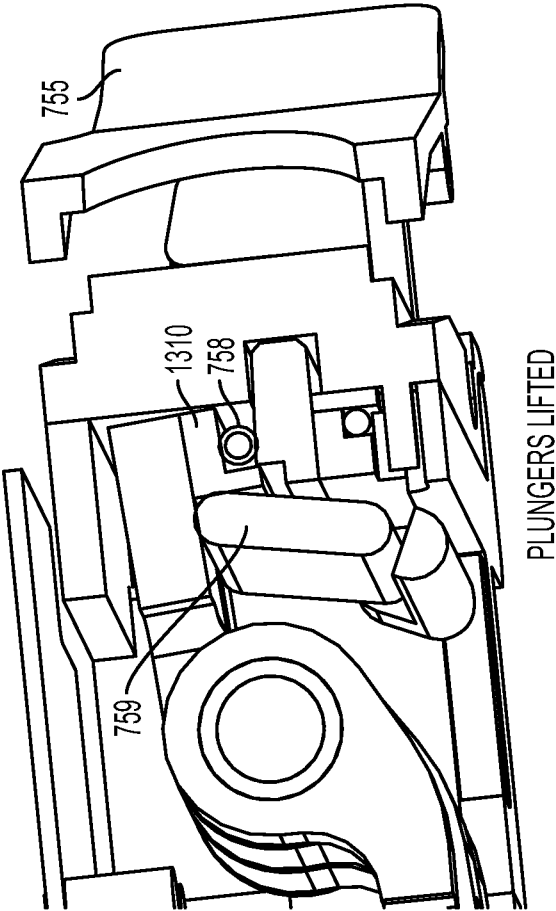


FIG. 229

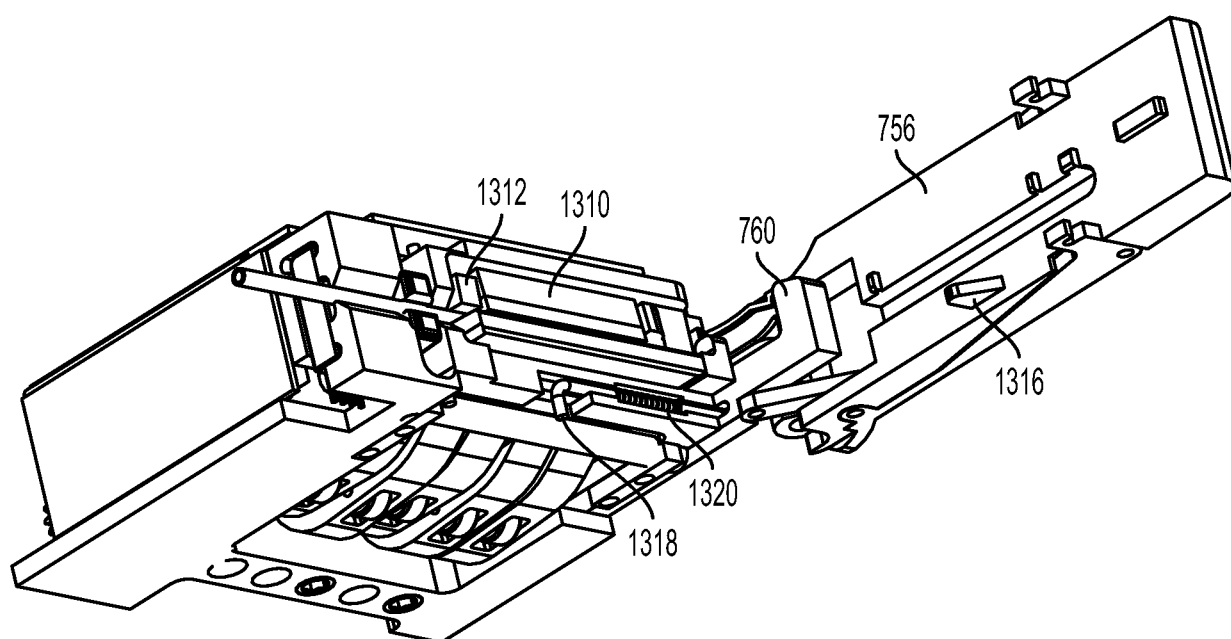


FIG. 230

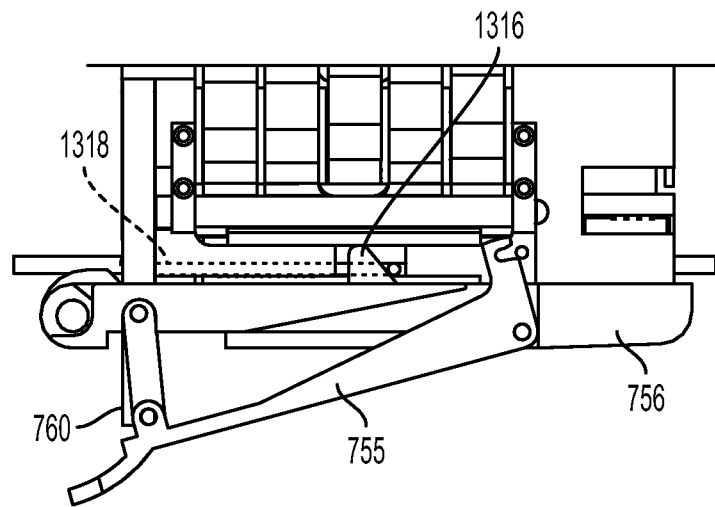


FIG. 231

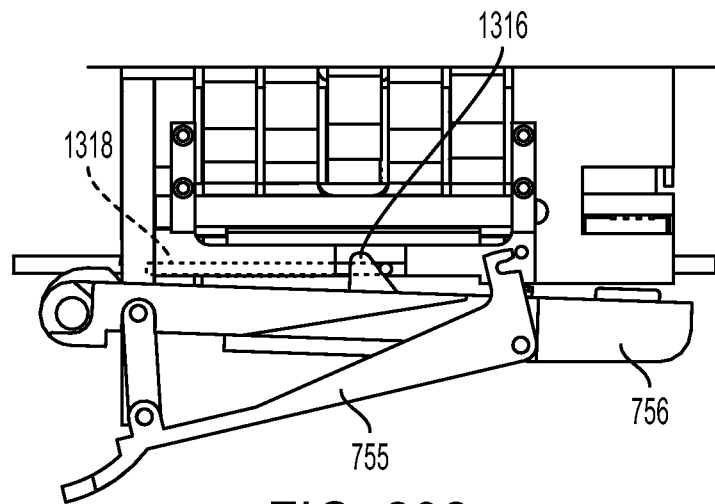


FIG. 232

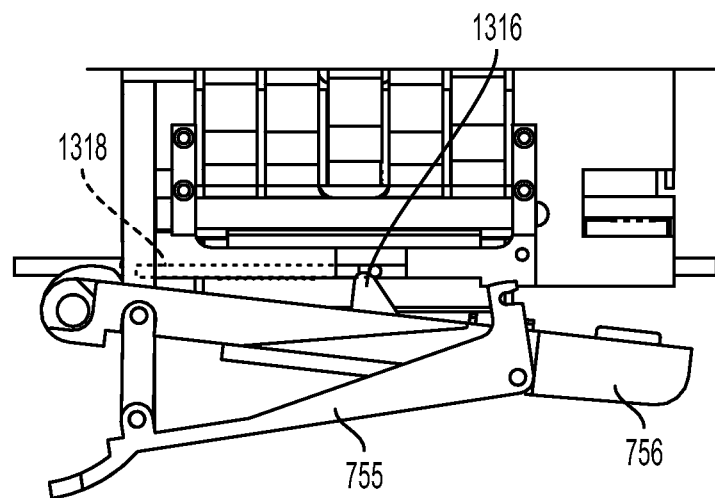


FIG. 233

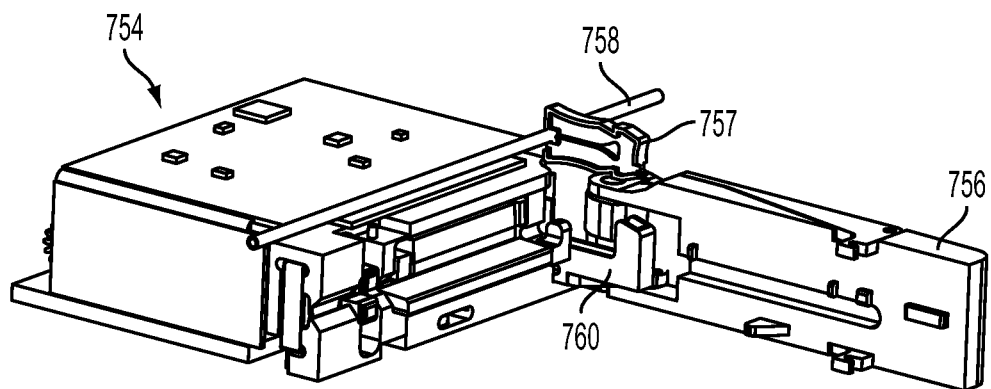


FIG. 234

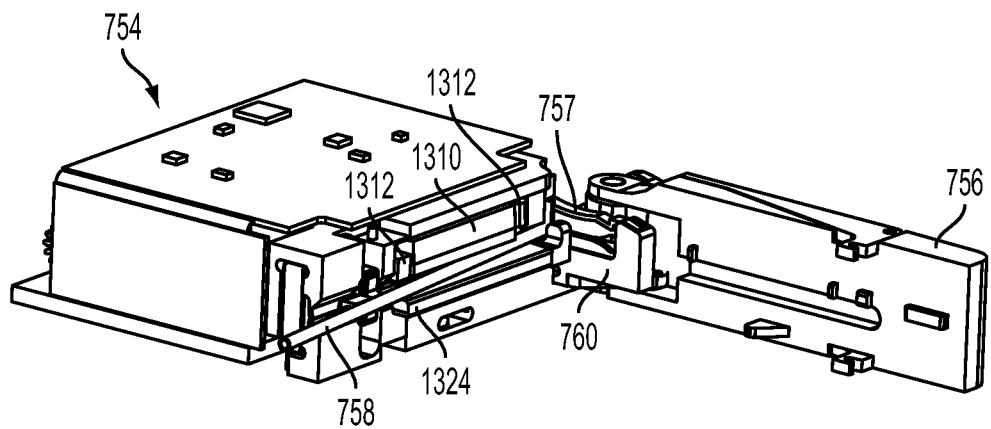


FIG. 235

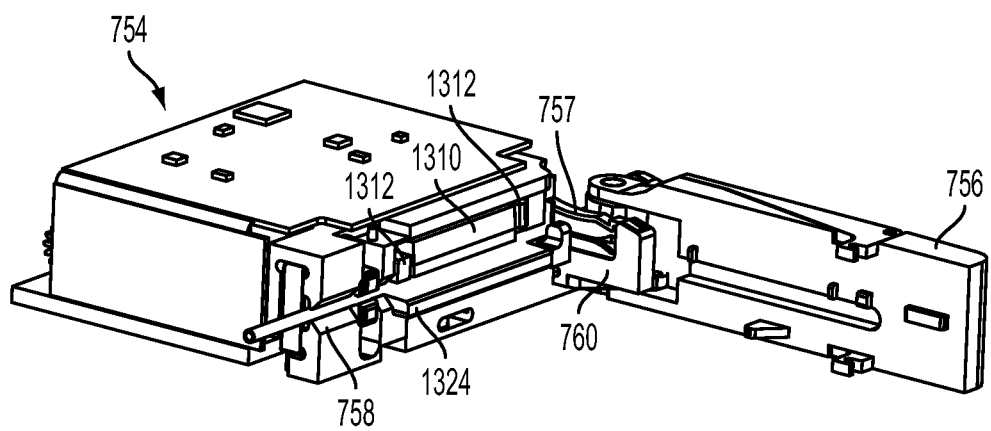
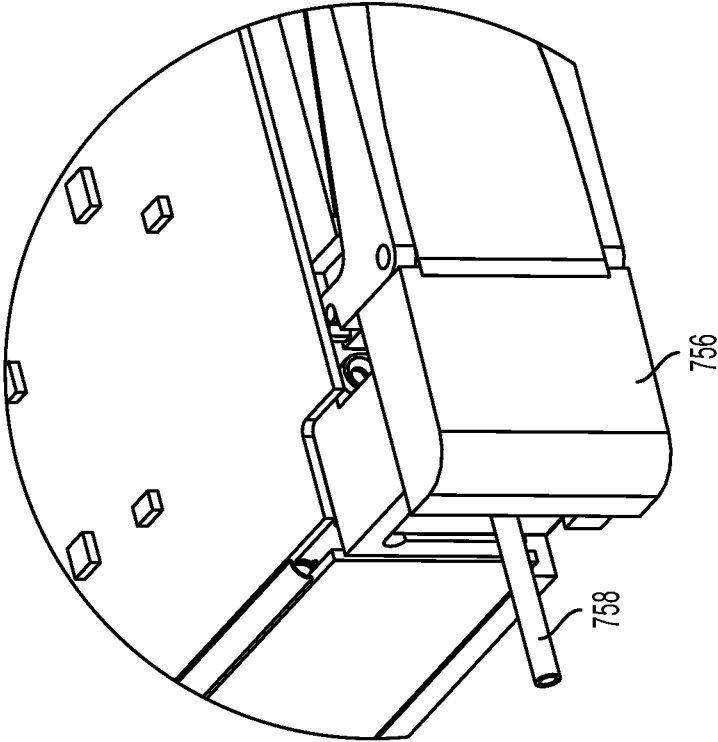
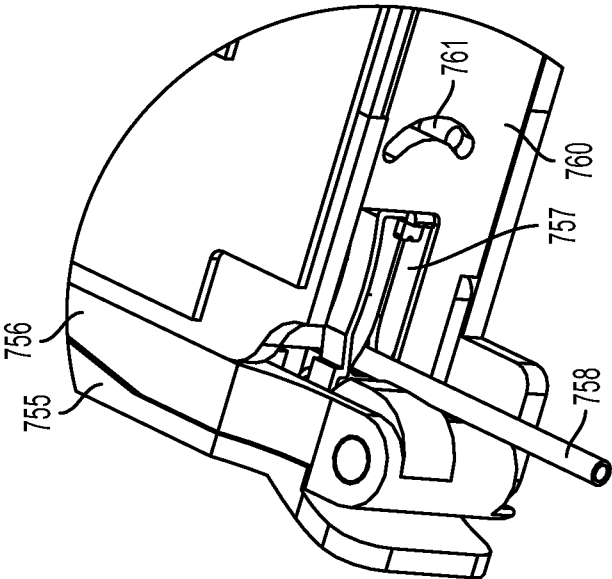


FIG. 236



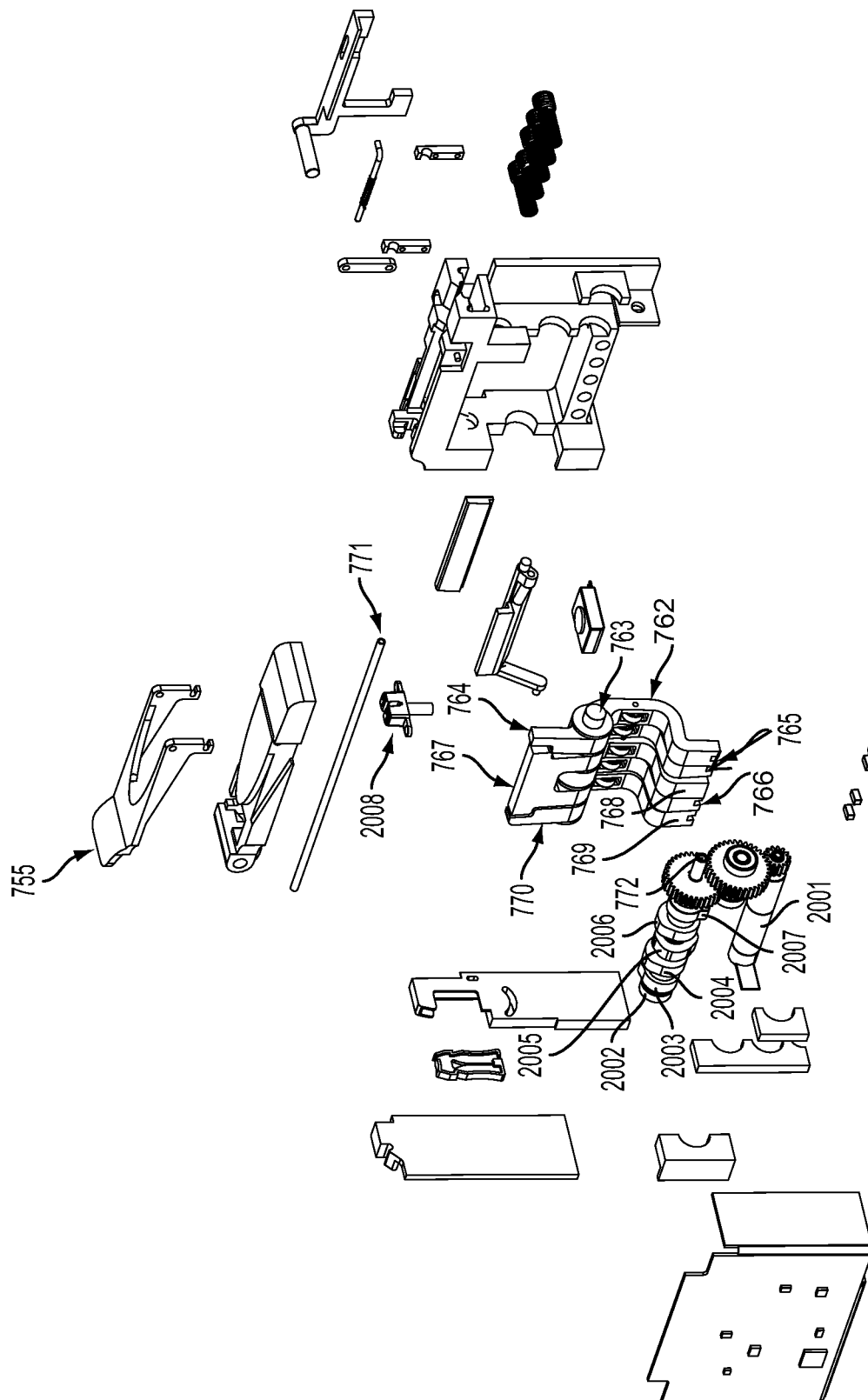


FIG. 239

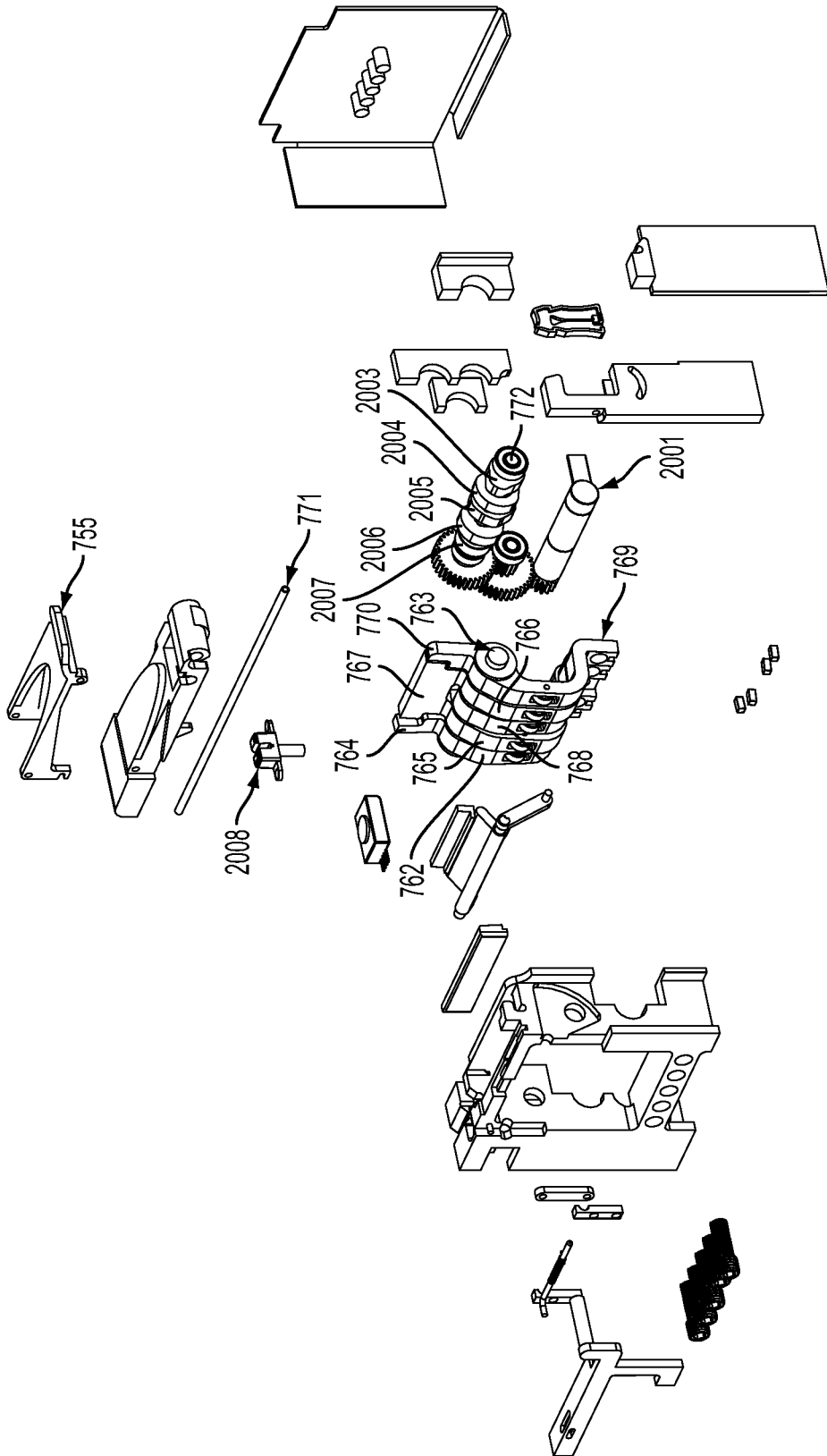


FIG. 240

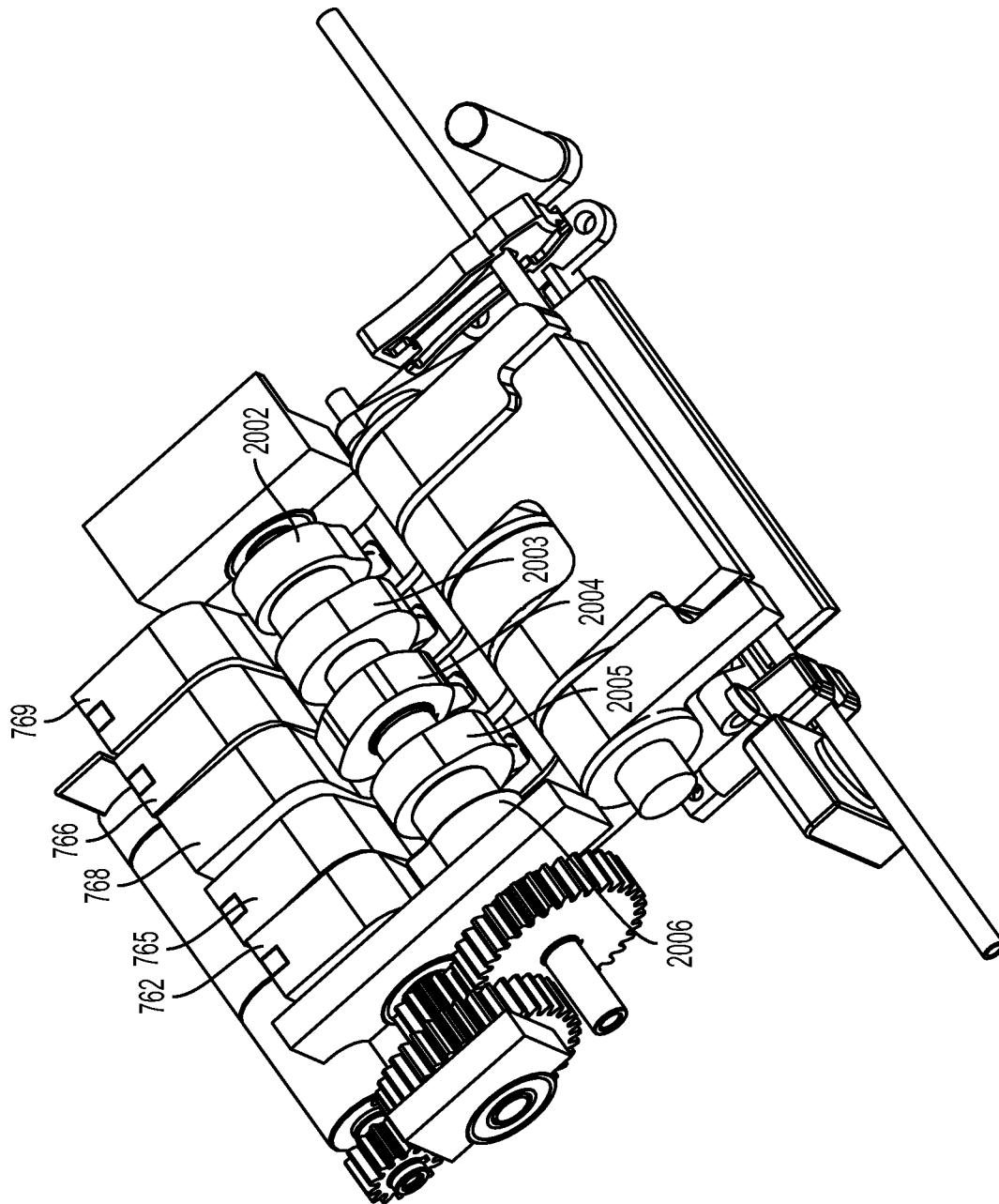


FIG. 241

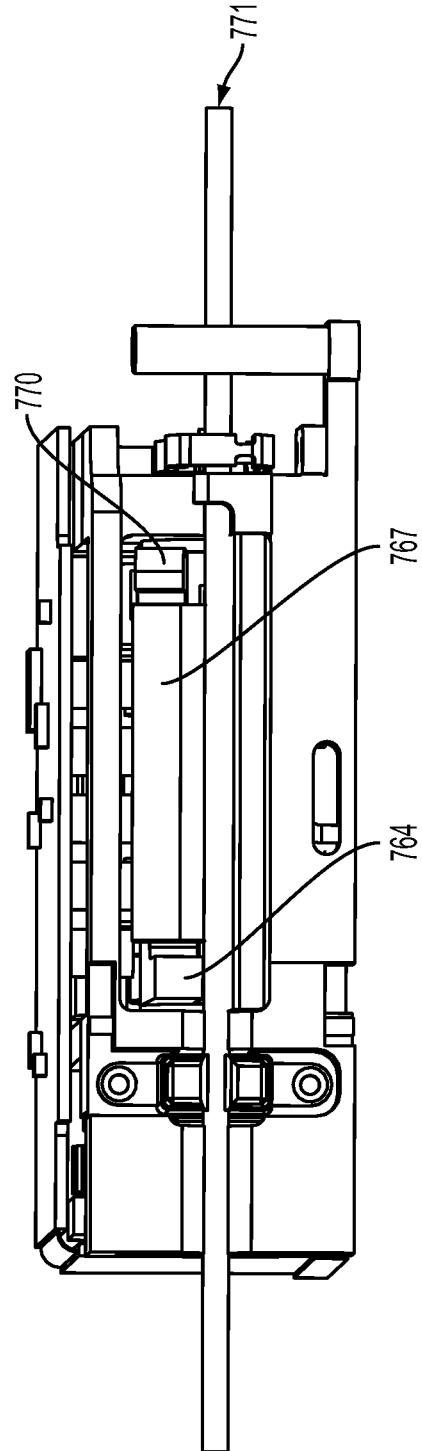


FIG. 242

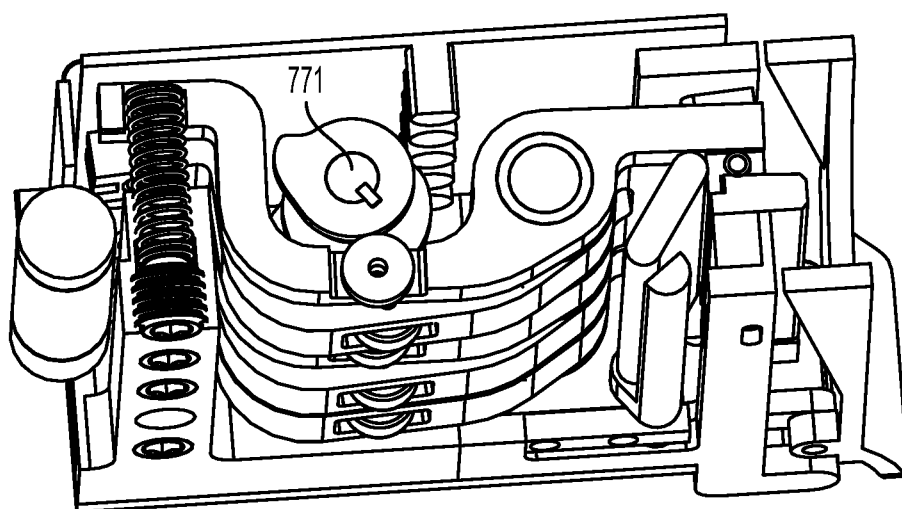


FIG. 243

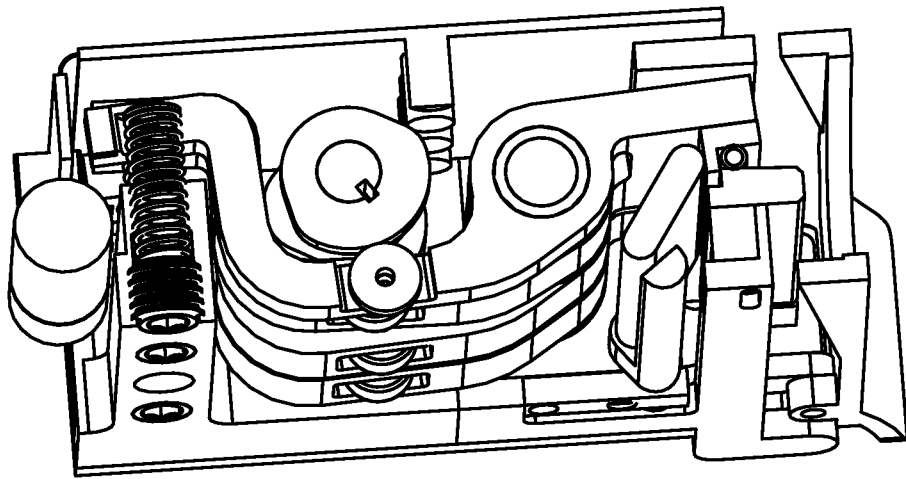


FIG. 244

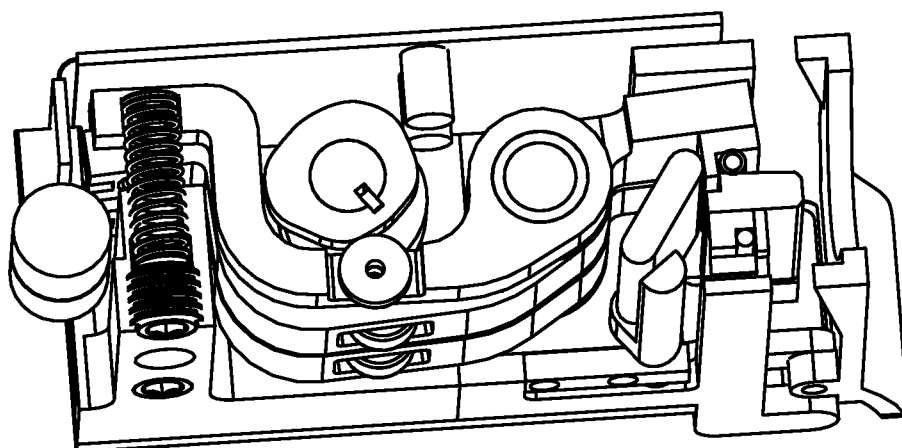


FIG. 245

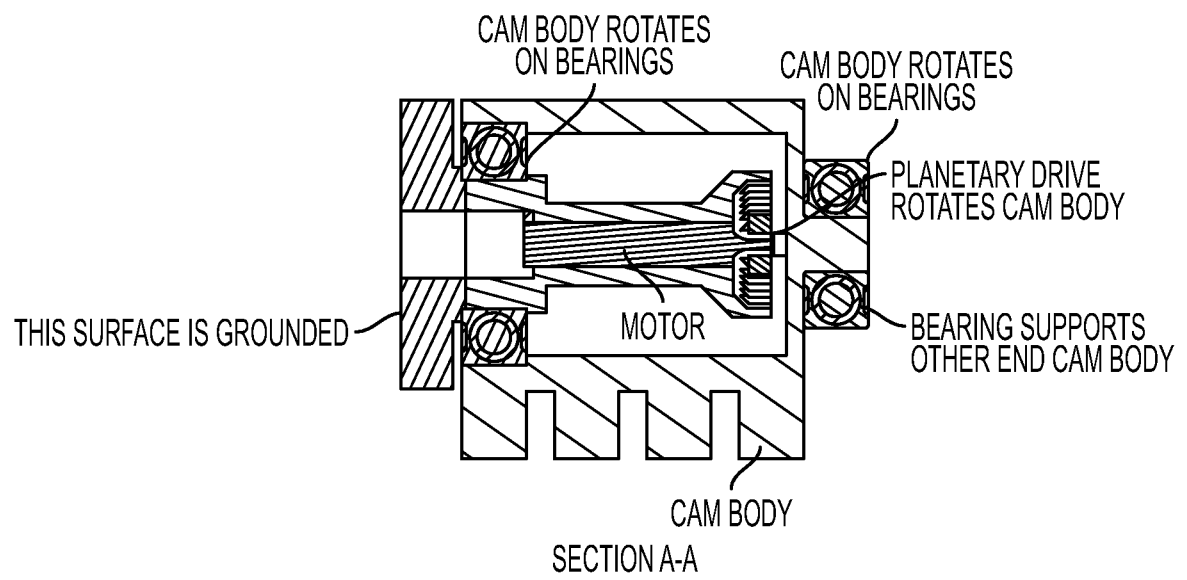


FIG. 246

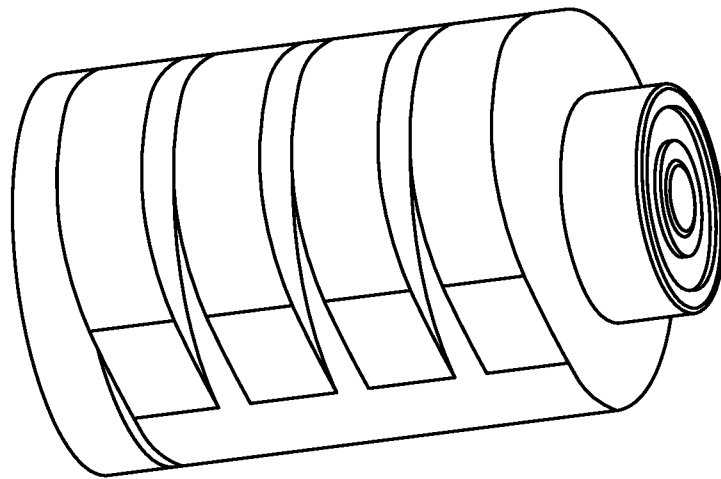


FIG. 247

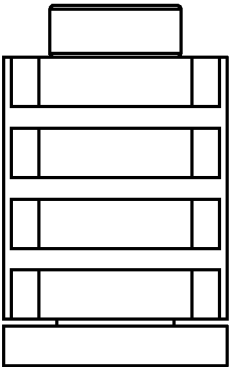


FIG. 248

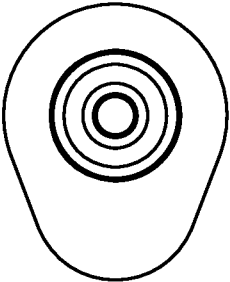


FIG. 249

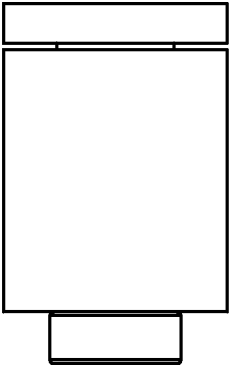


FIG. 250

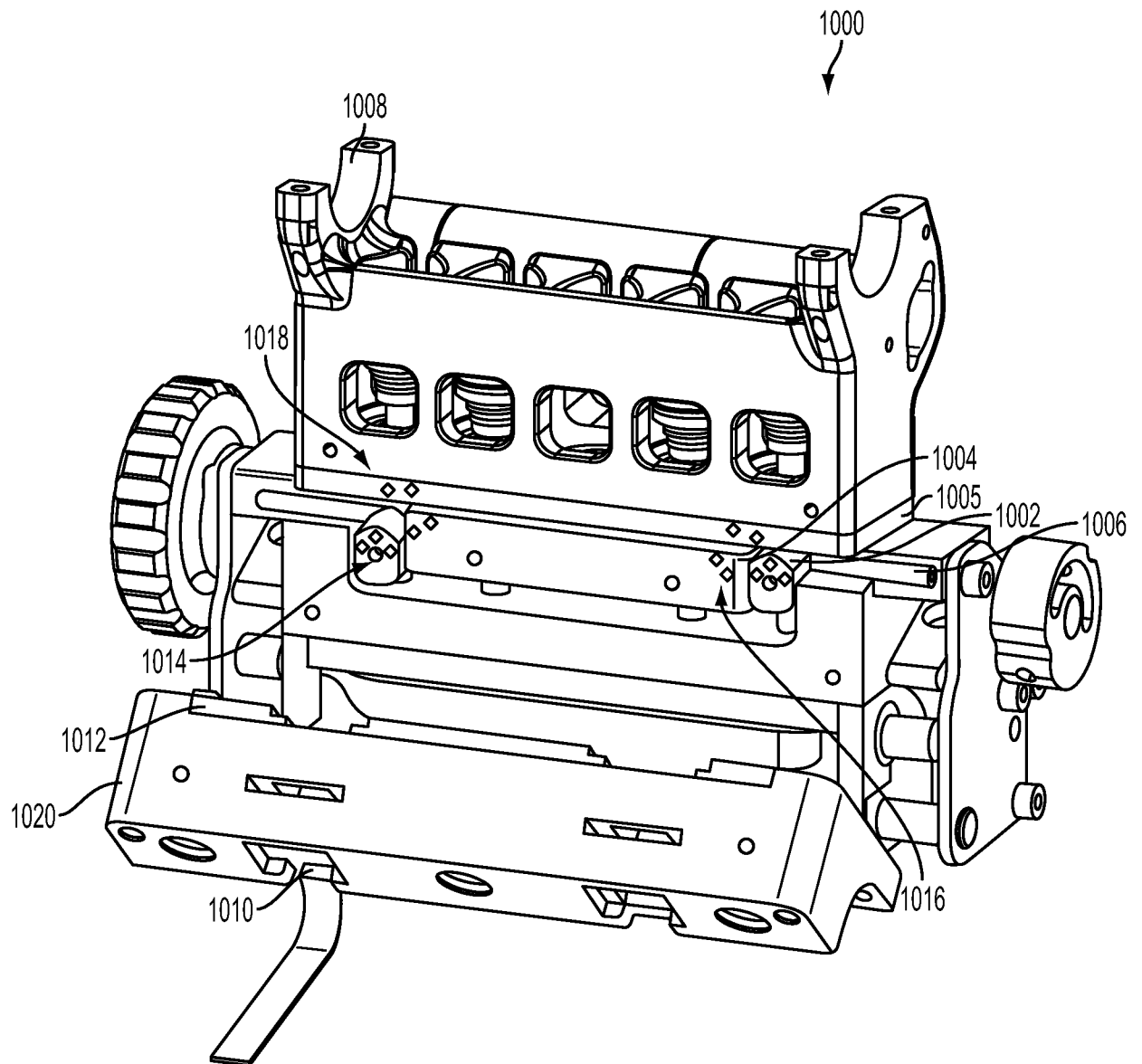


FIG. 251

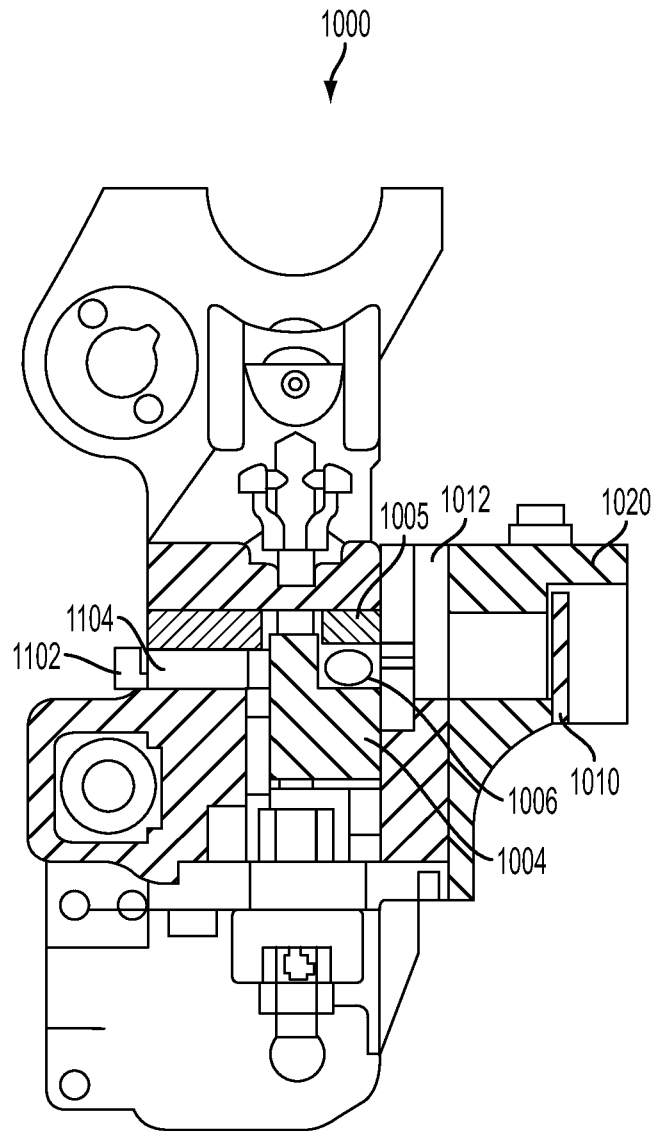


FIG. 252

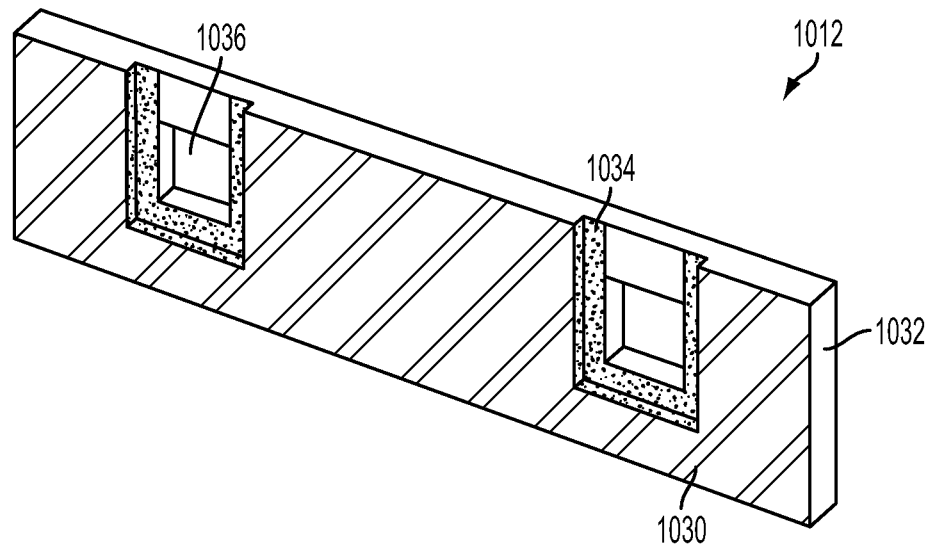


FIG. 253

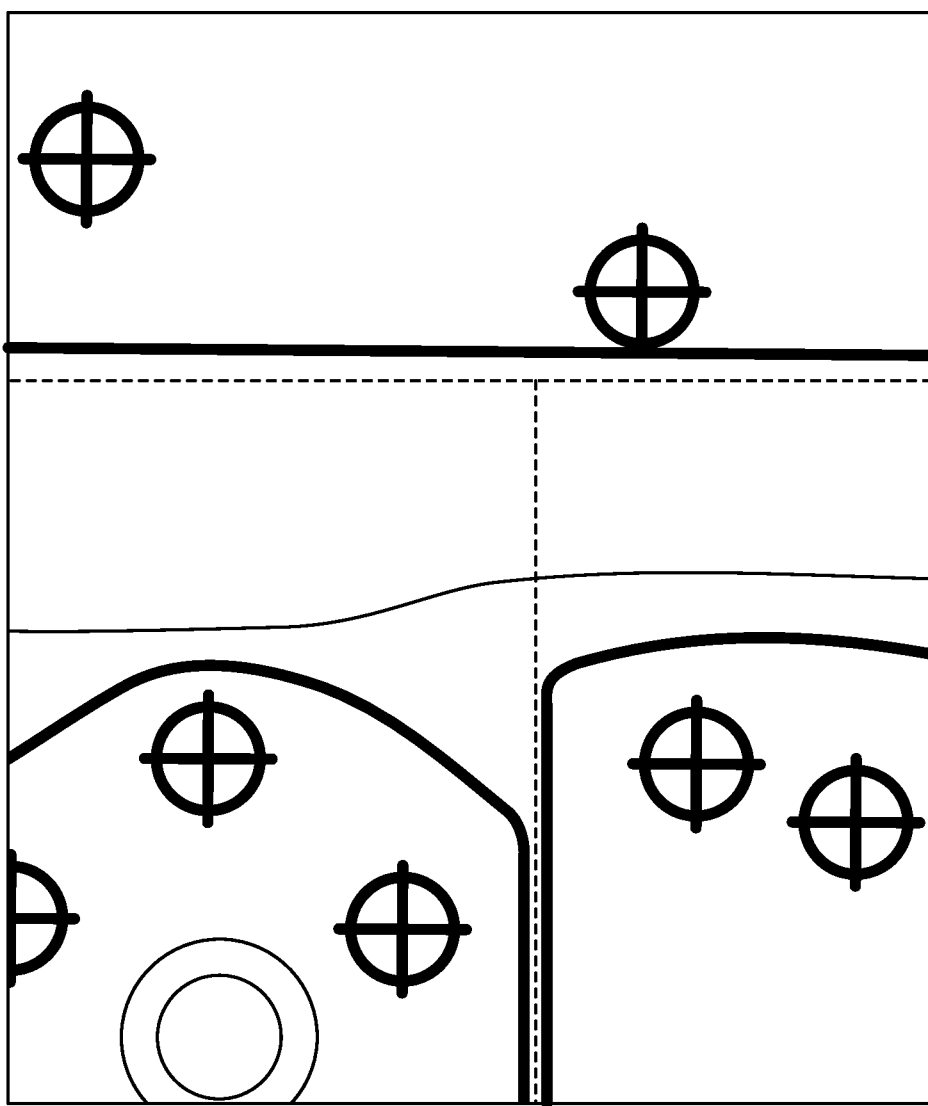


FIG. 254

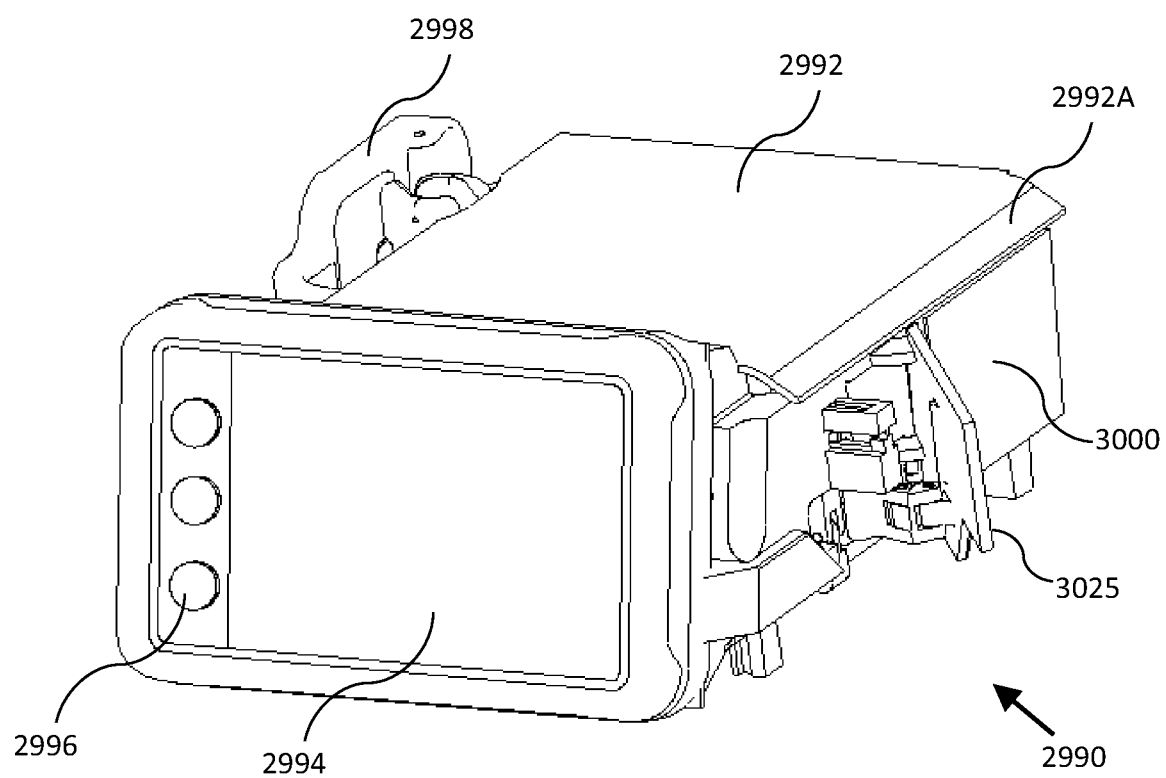


FIG. 255

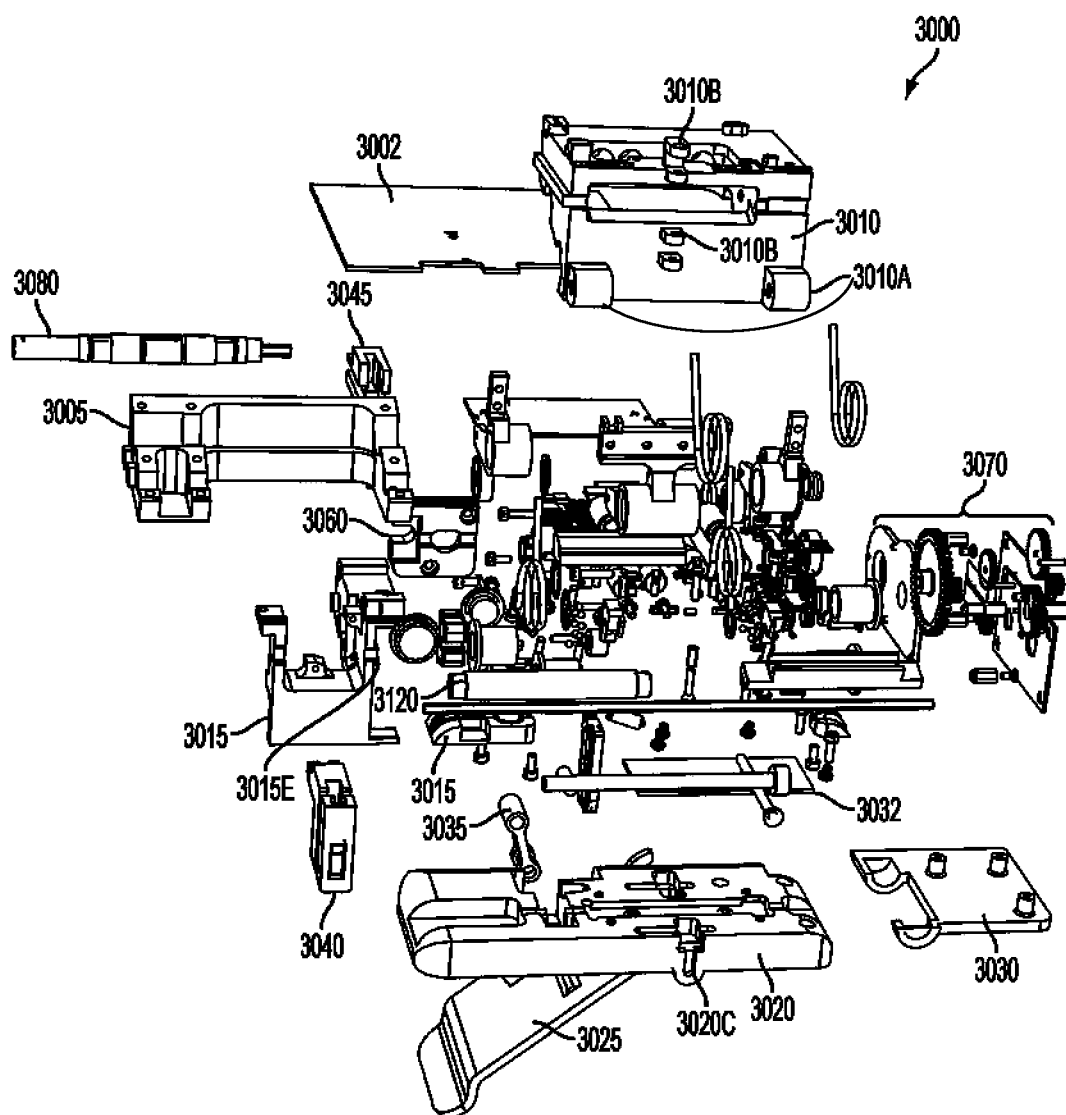


FIG. 256A

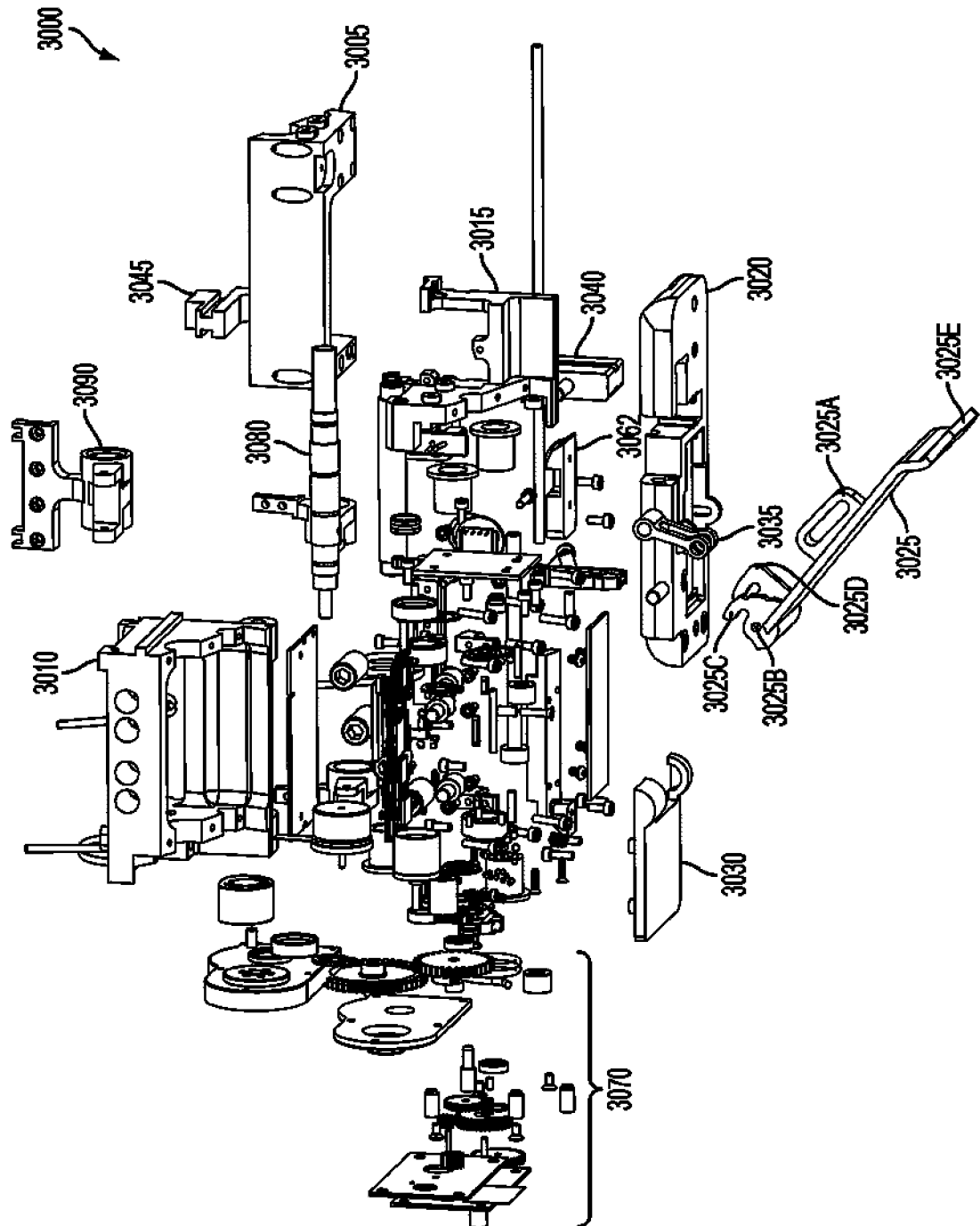


FIG. 256B

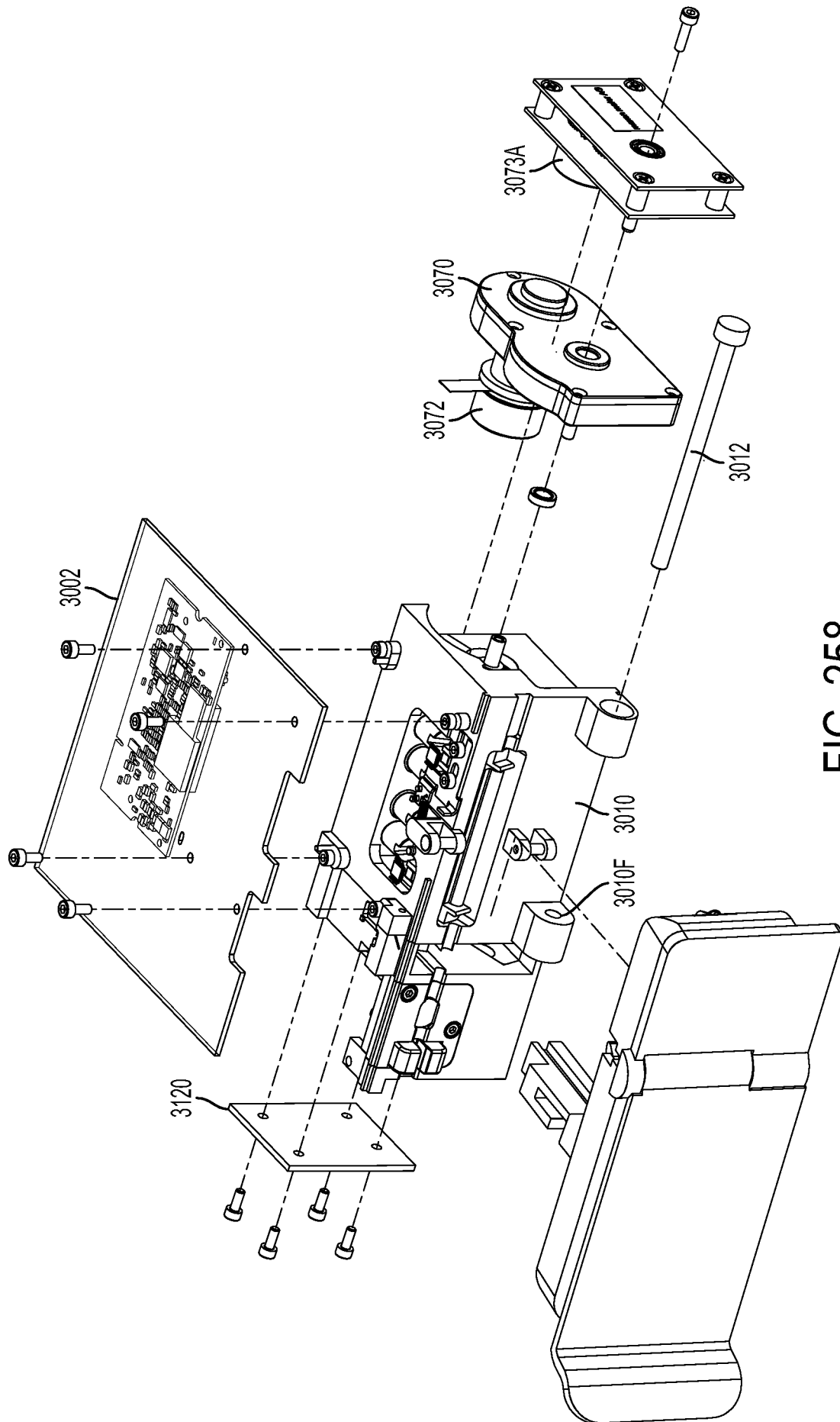


FIG. 258

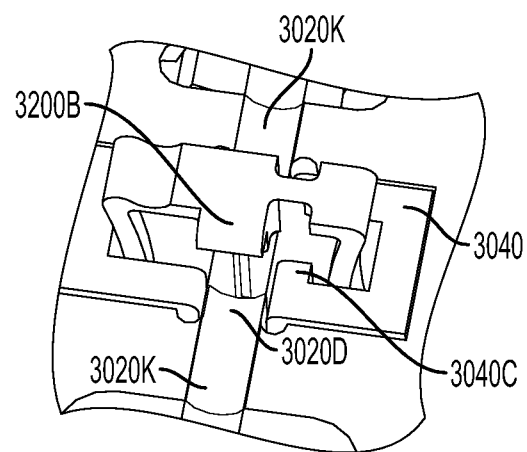


FIG. 259

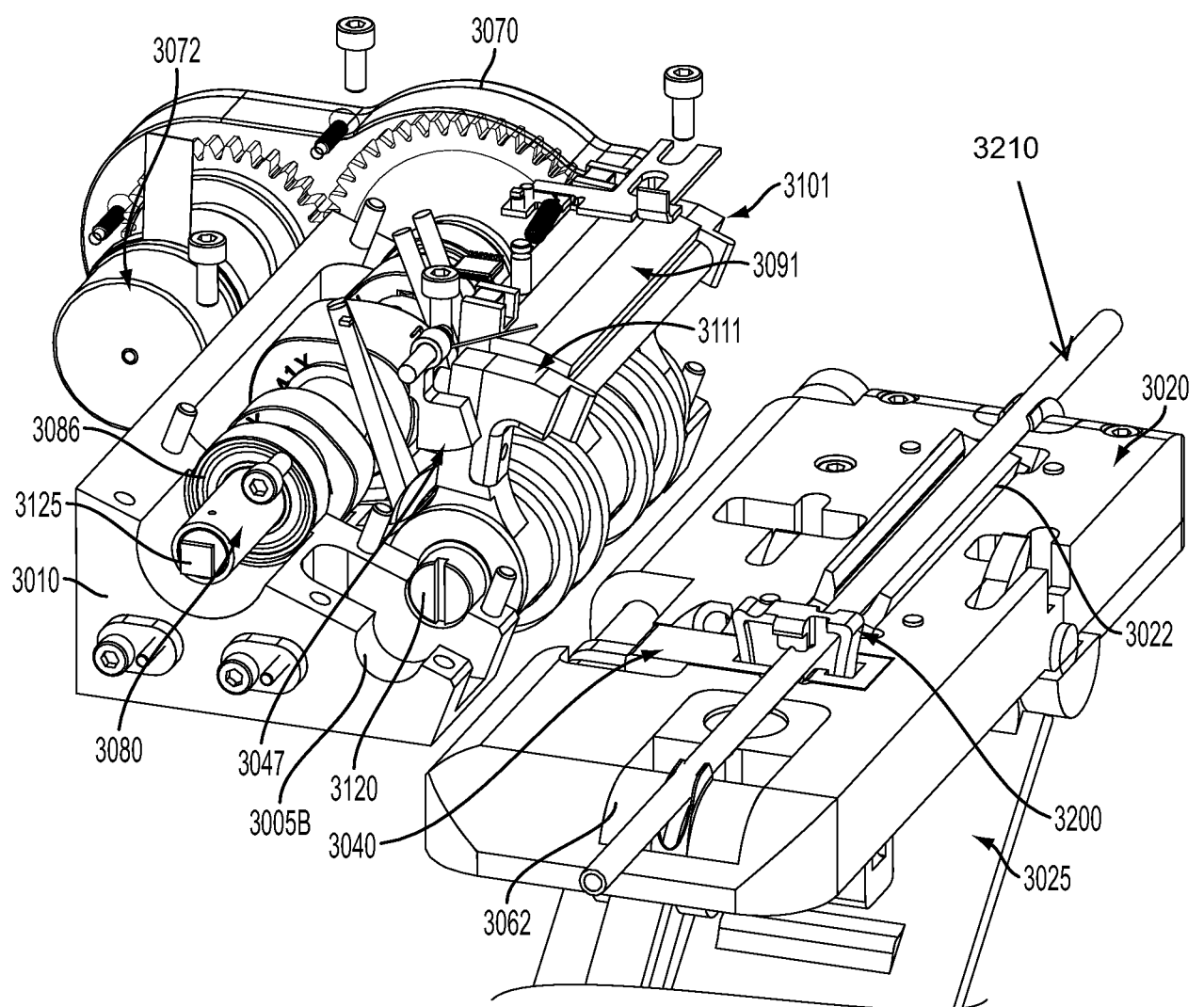


FIG. 260

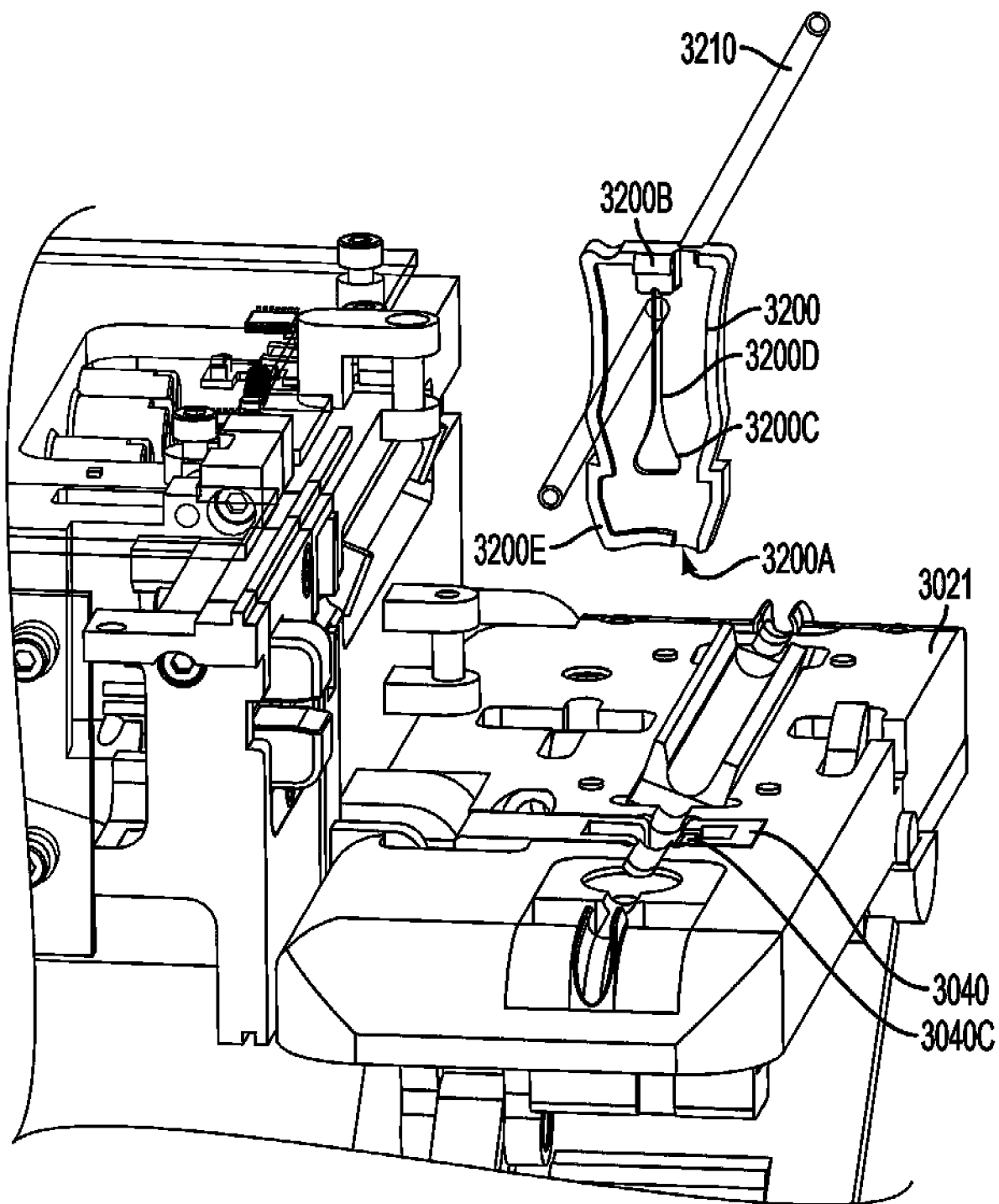


FIG. 261

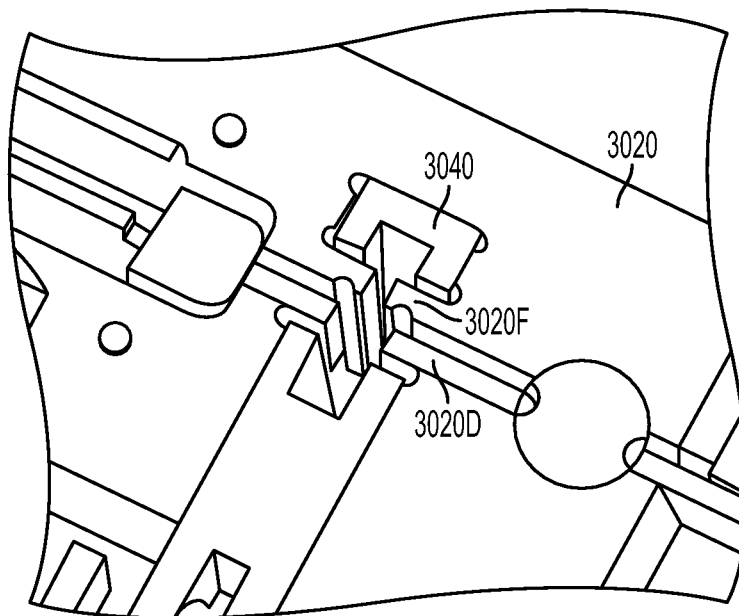


FIG. 262

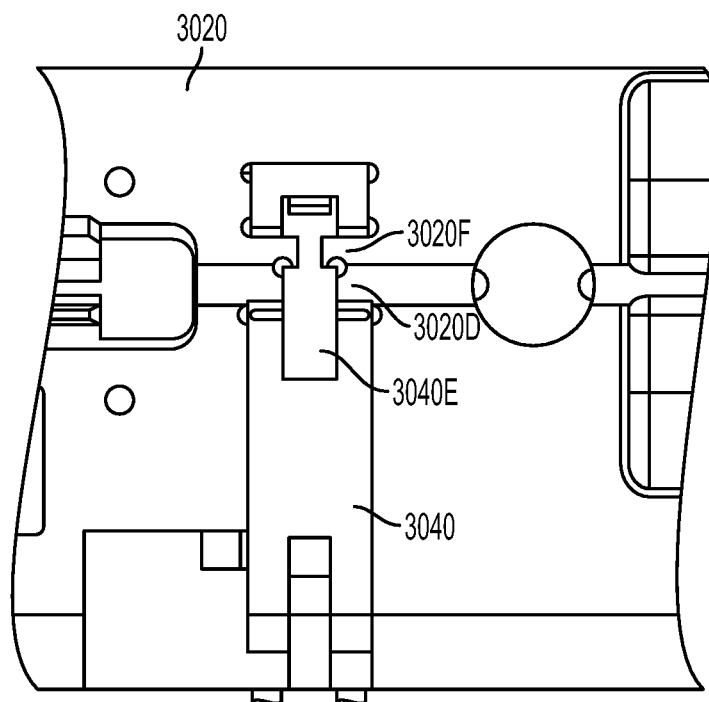


FIG. 263

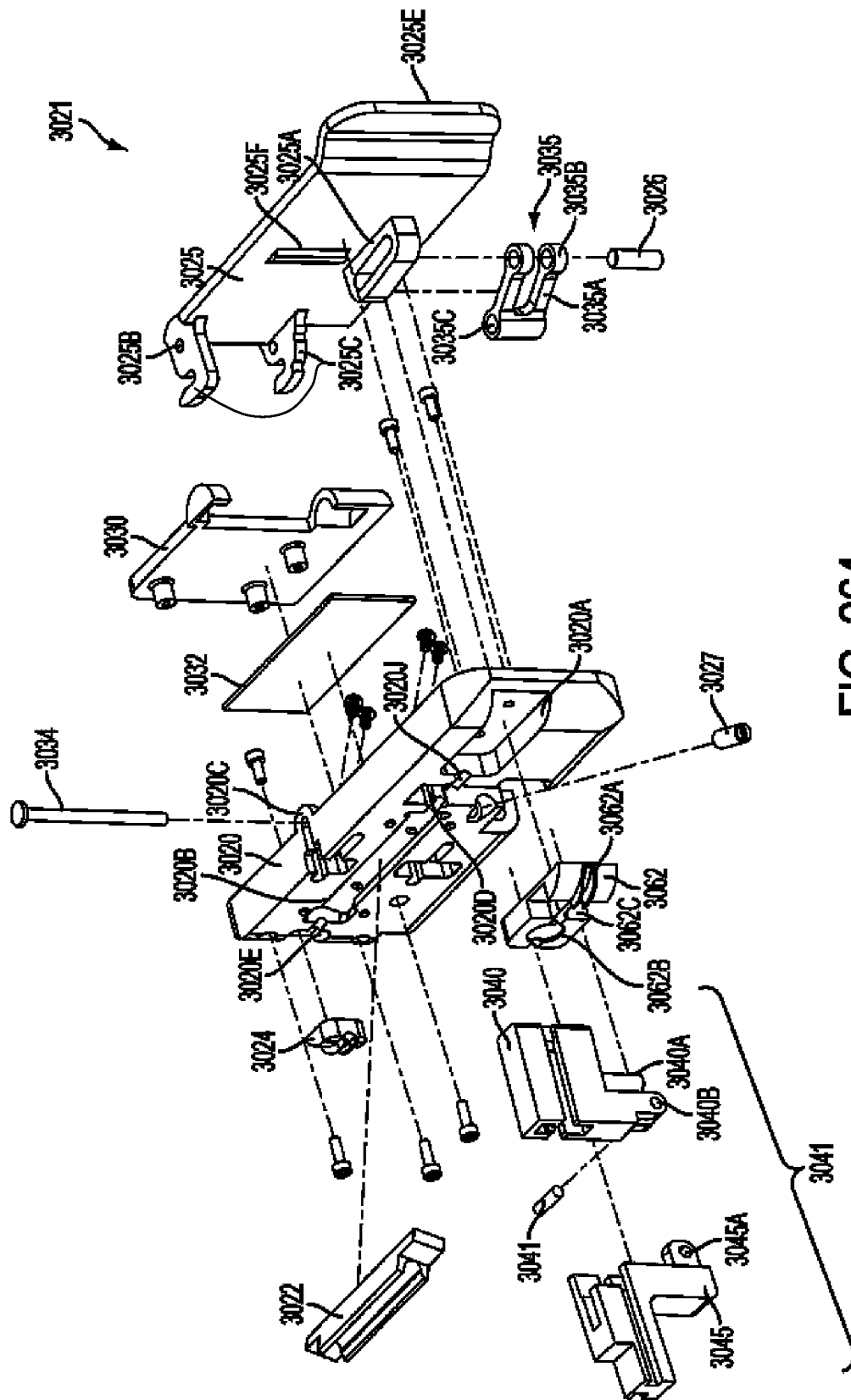


FIG. 264

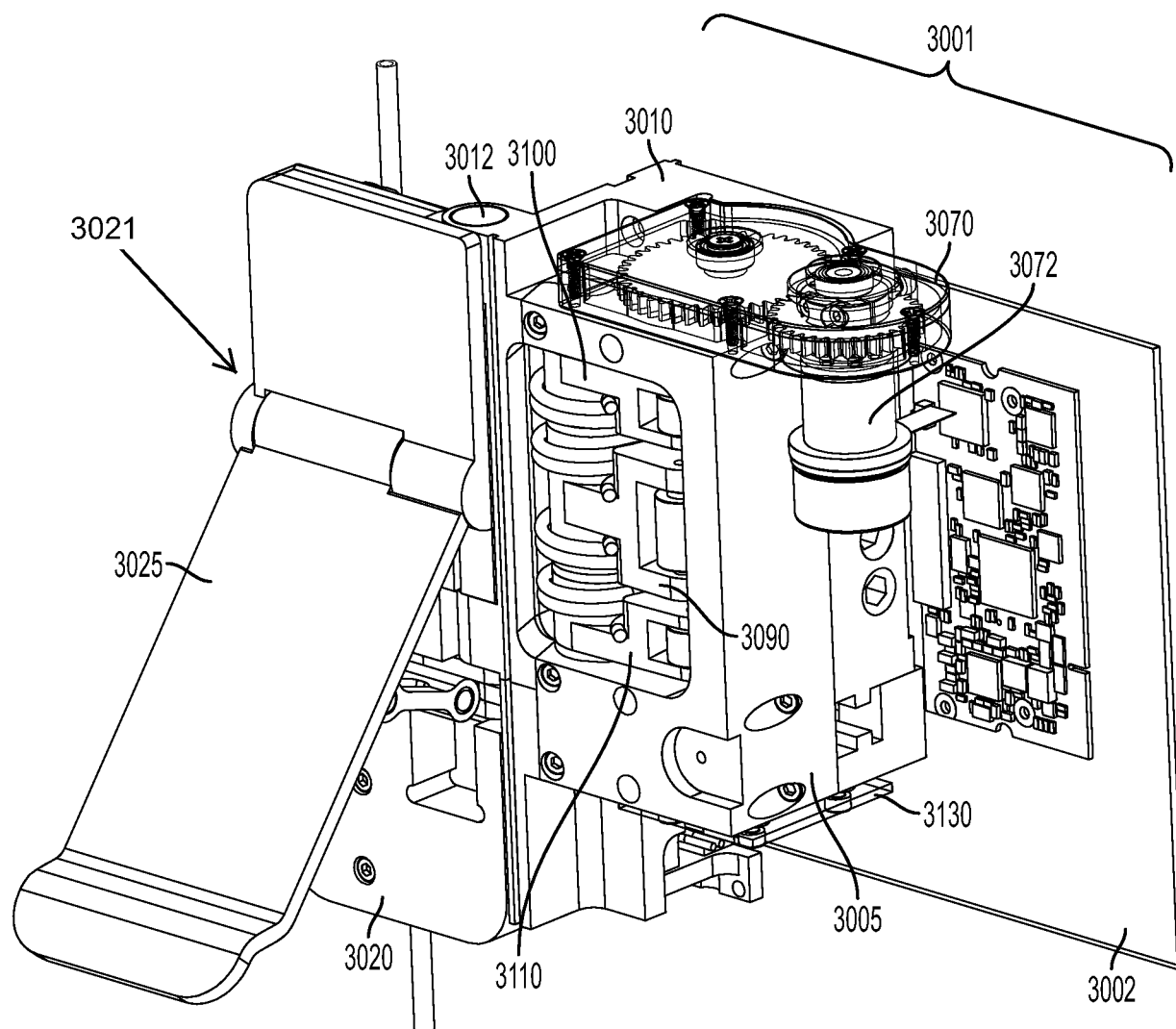


FIG. 265

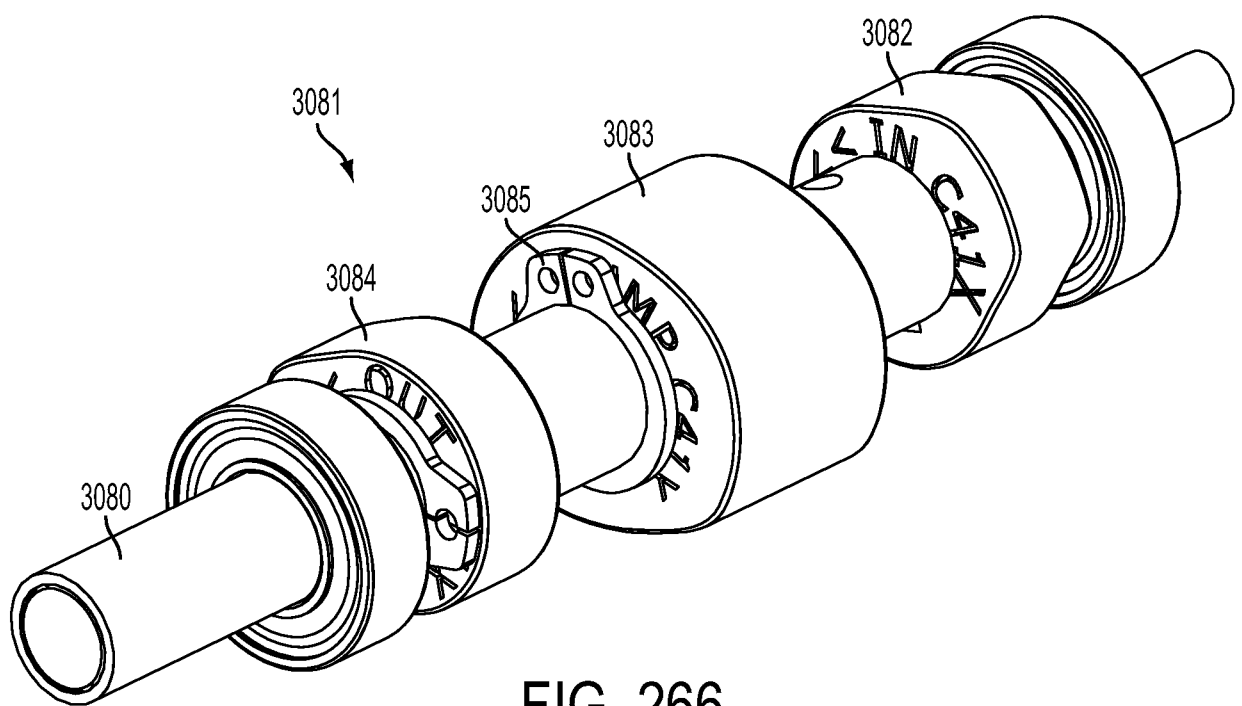


FIG. 266

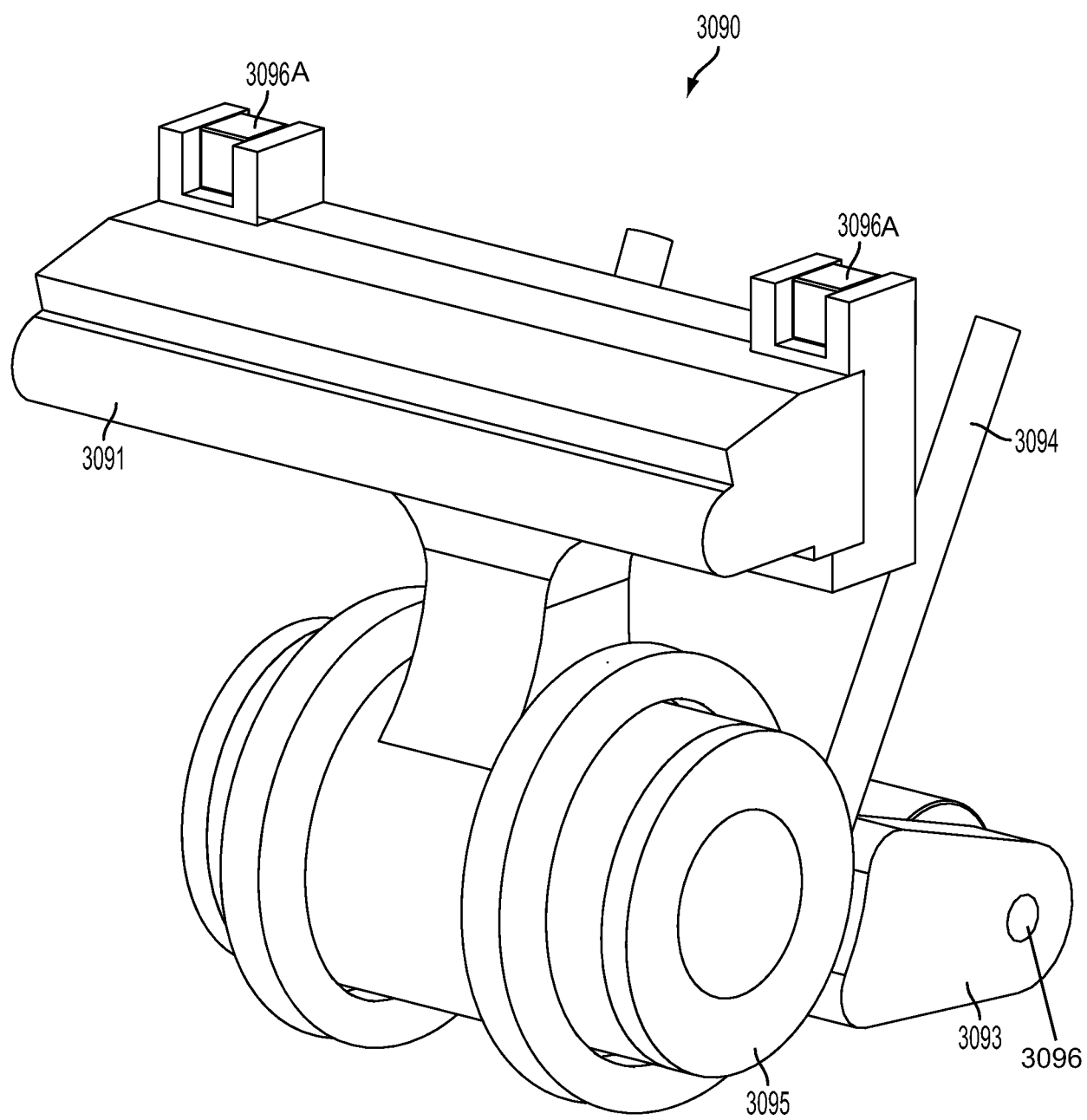


FIG. 267

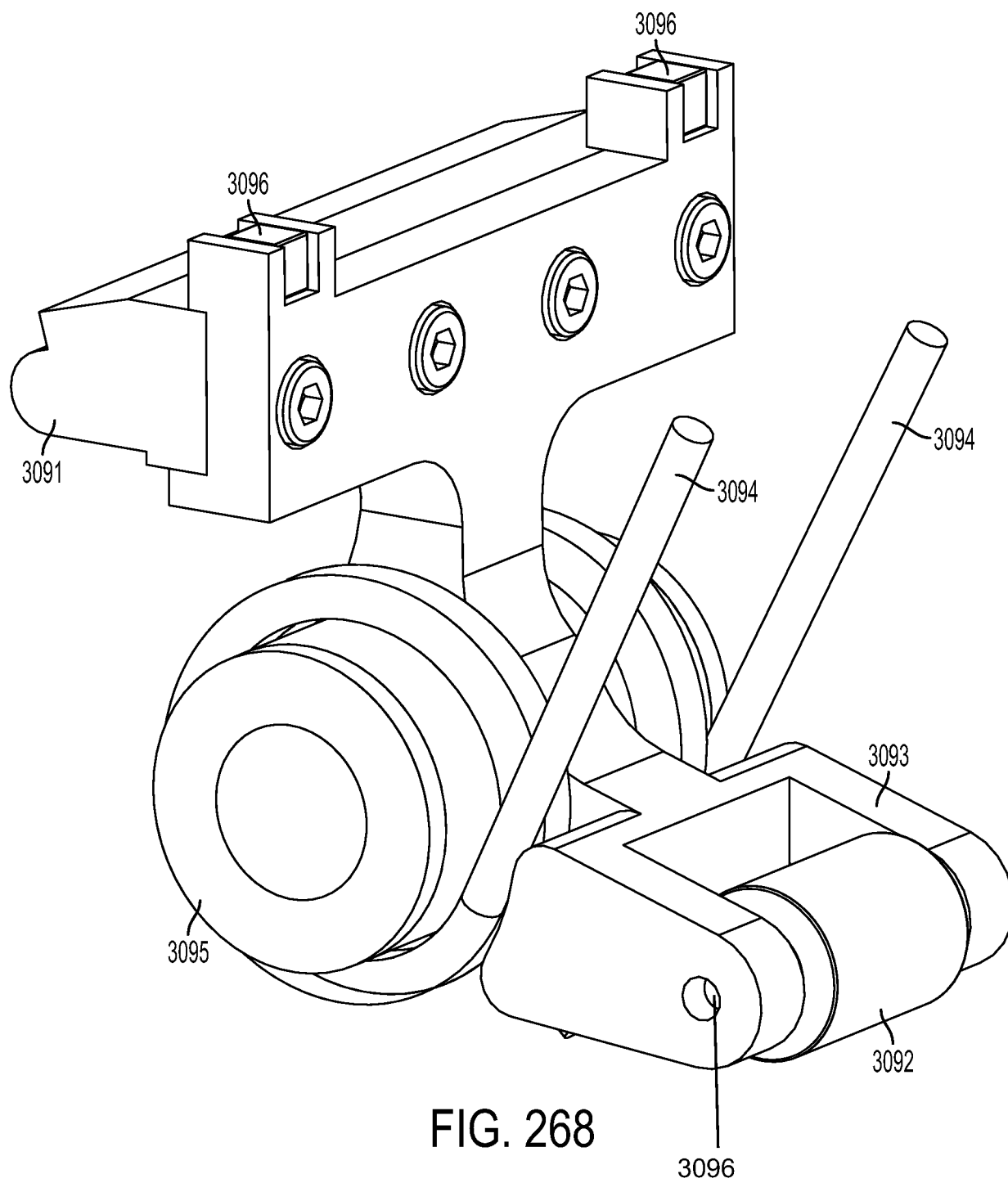


FIG. 268

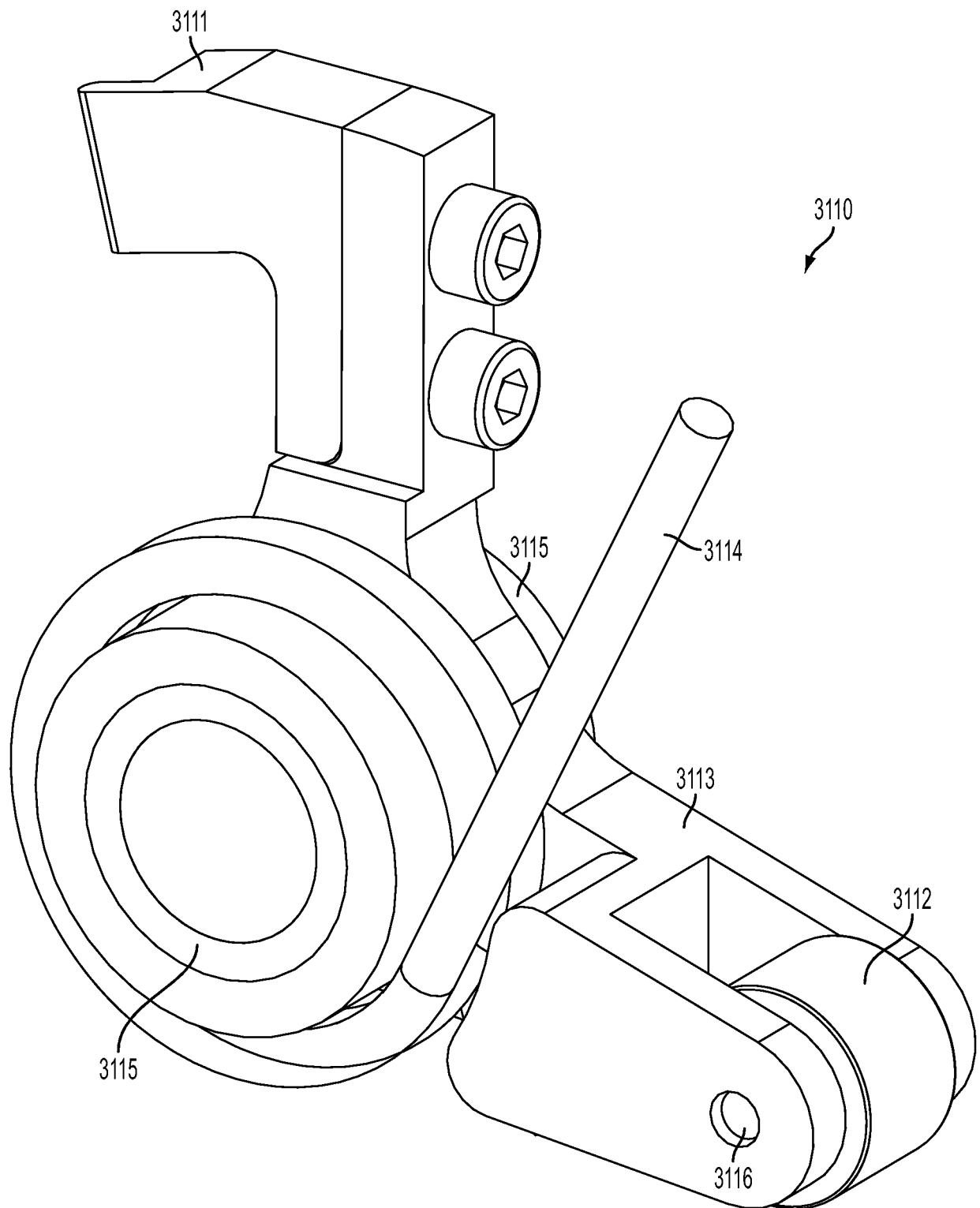


FIG. 269

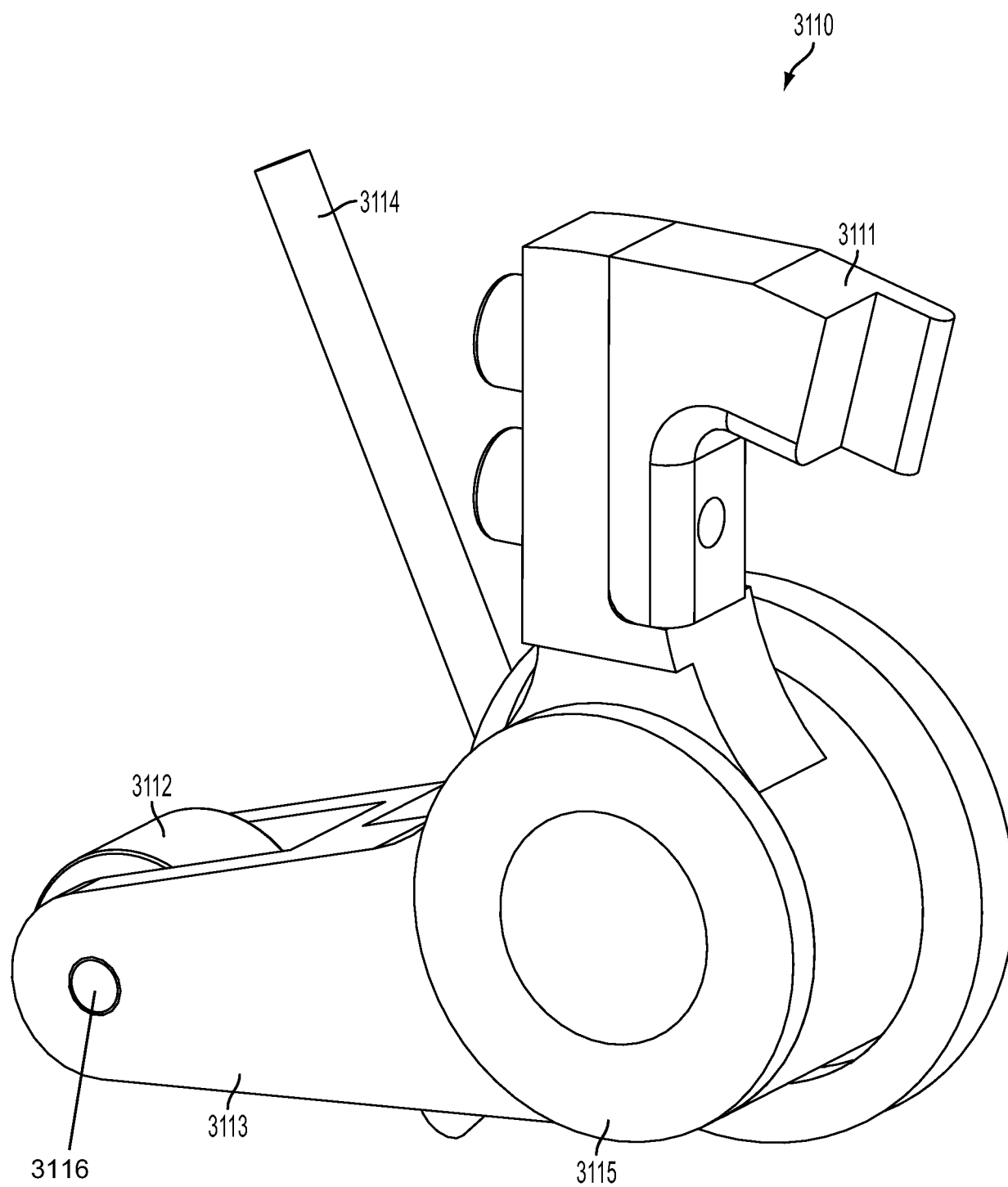


FIG. 270

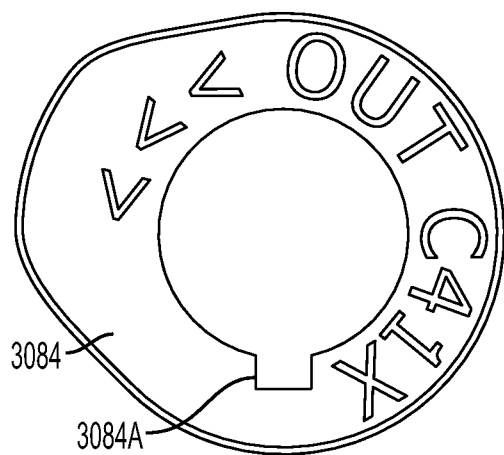


FIG. 271

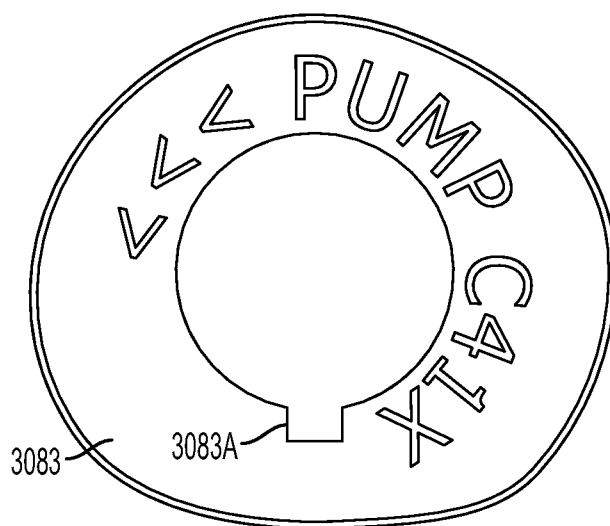


FIG. 272

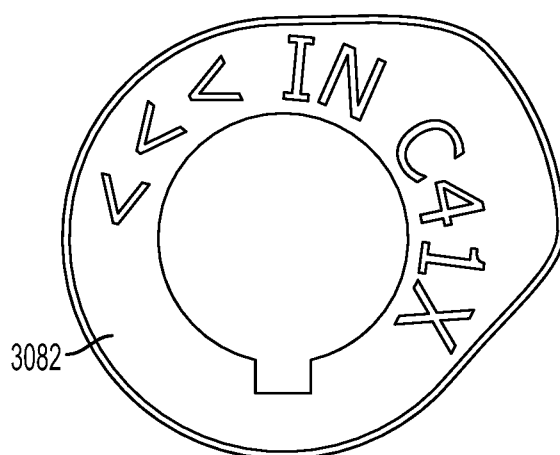


FIG. 273

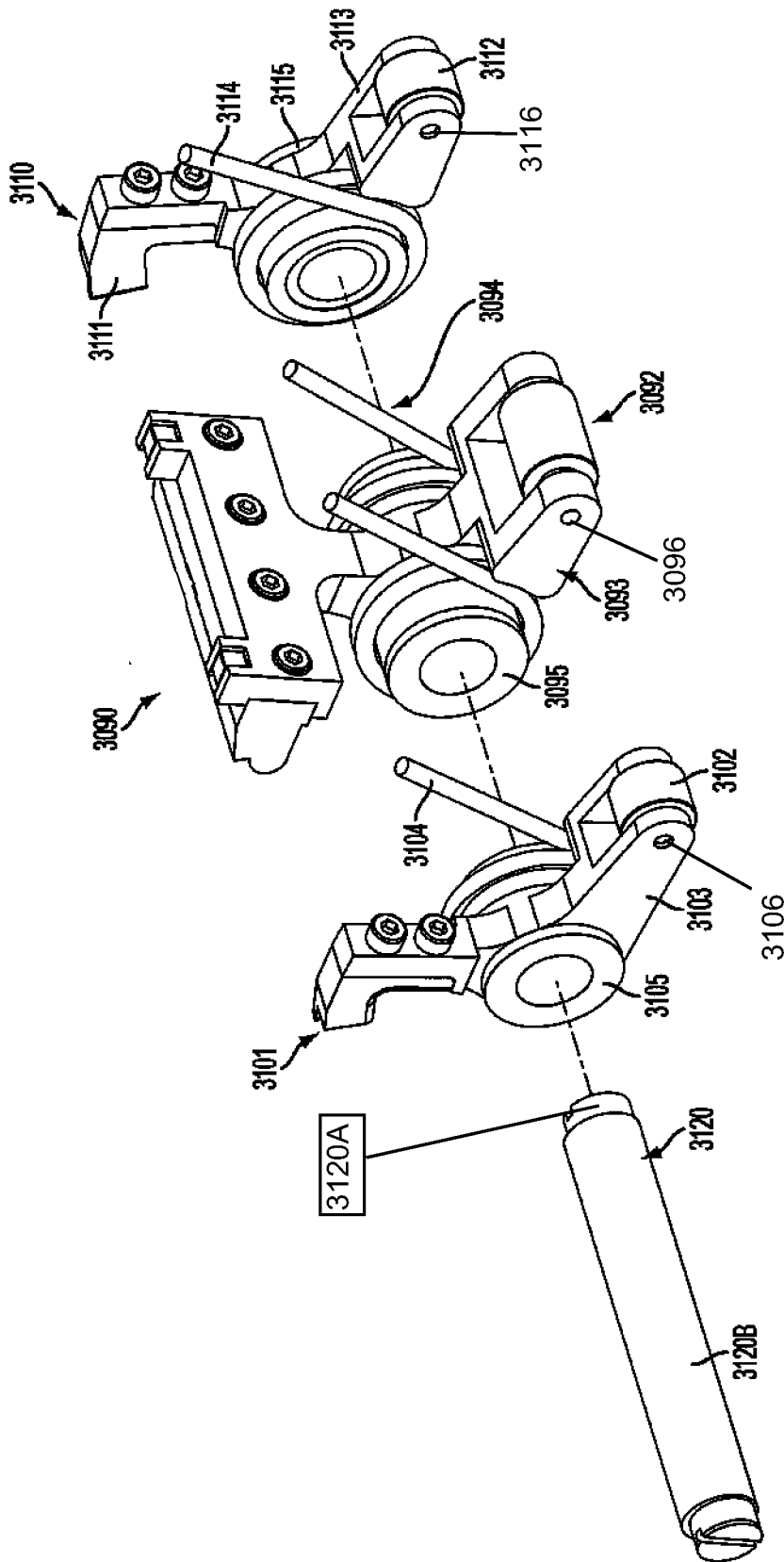


FIG. 274

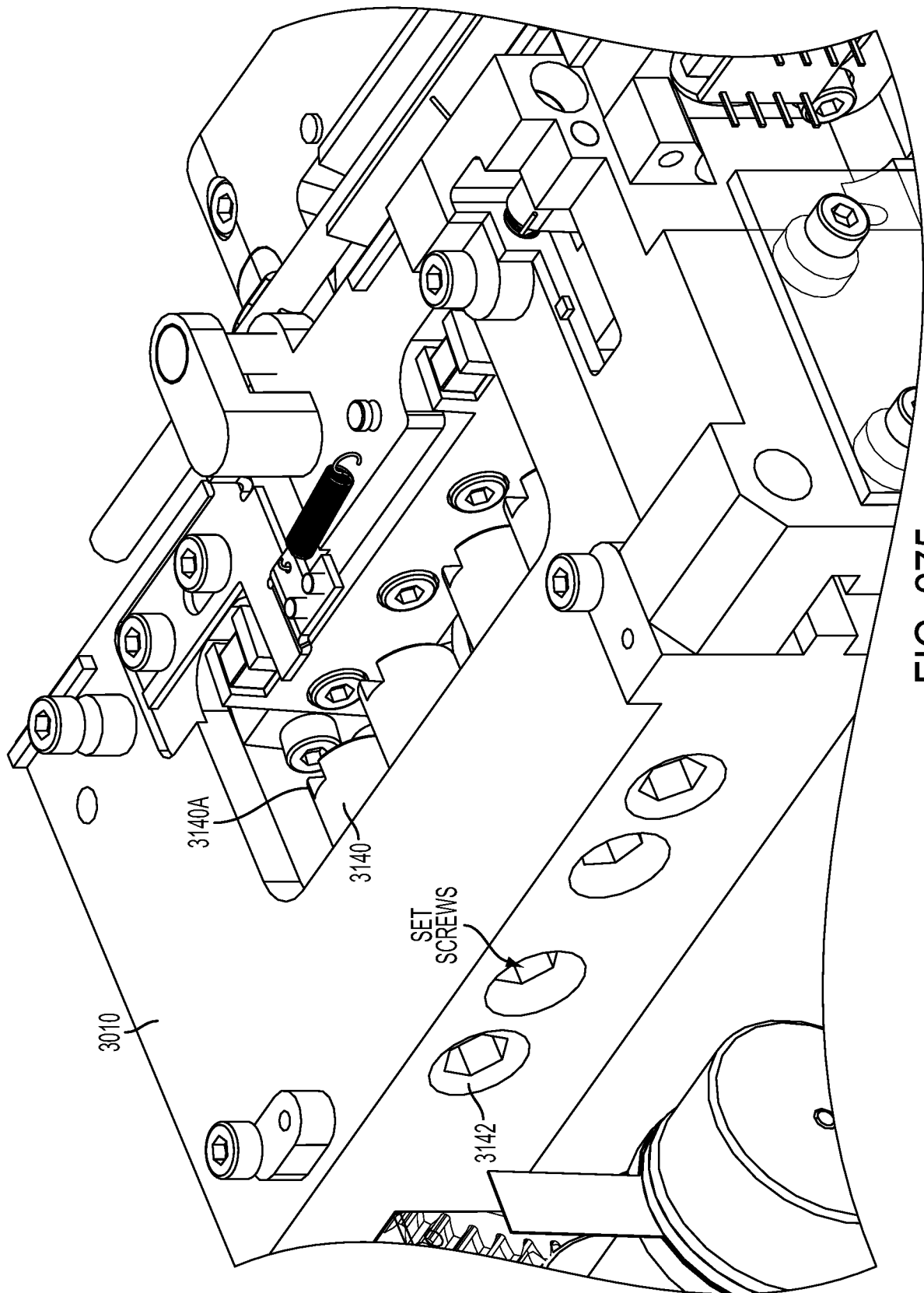
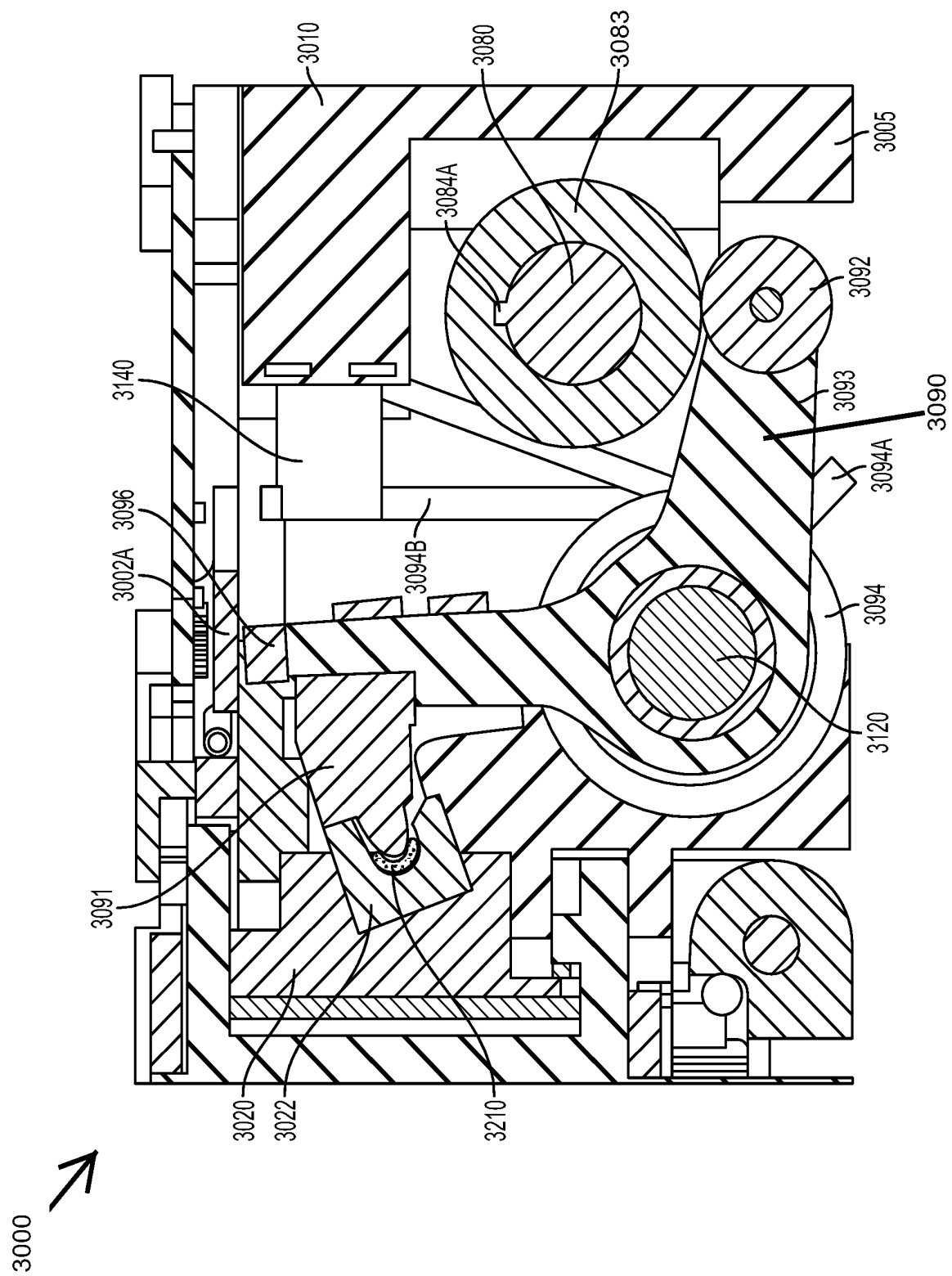


FIG. 275



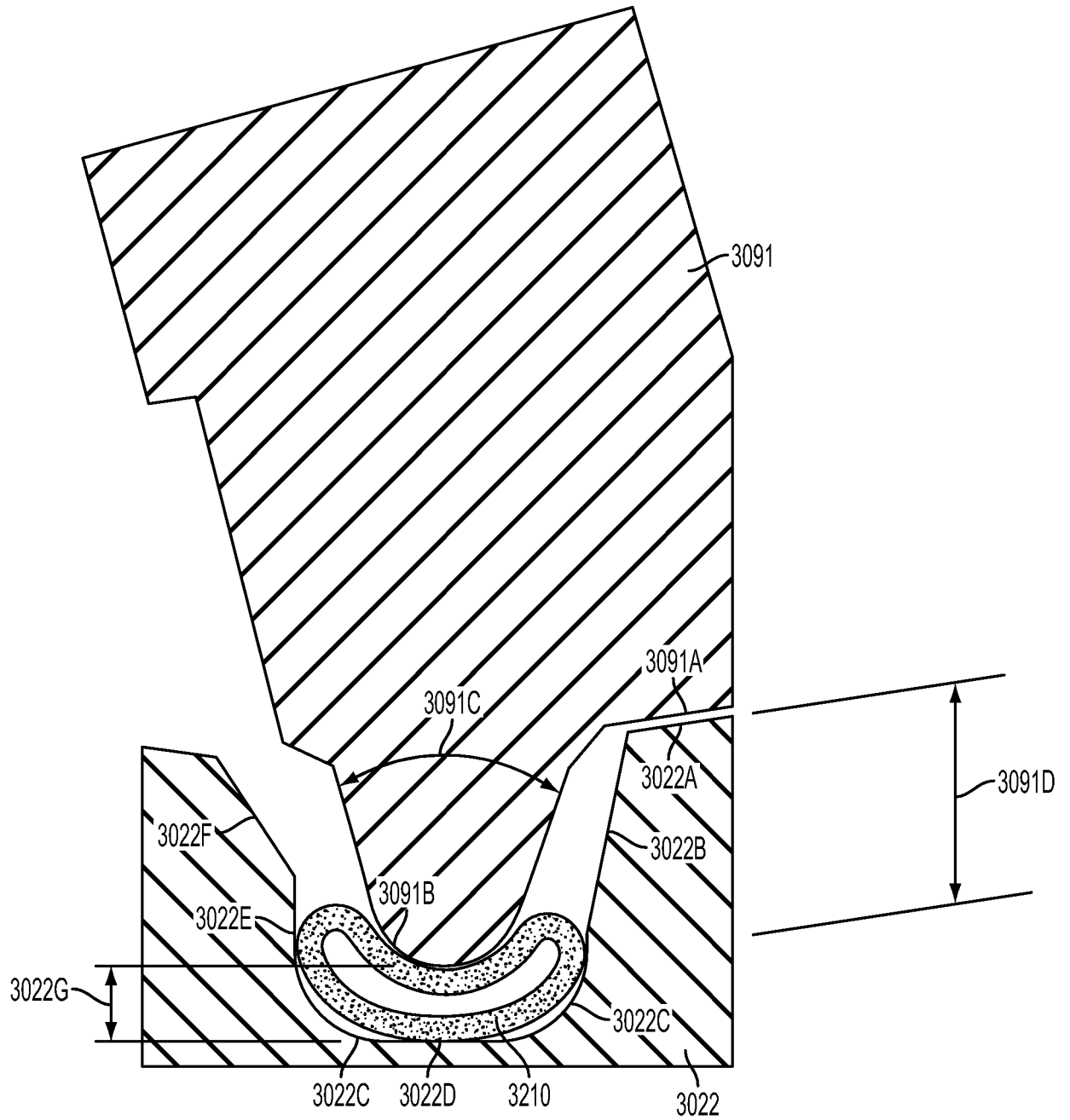


FIG. 277

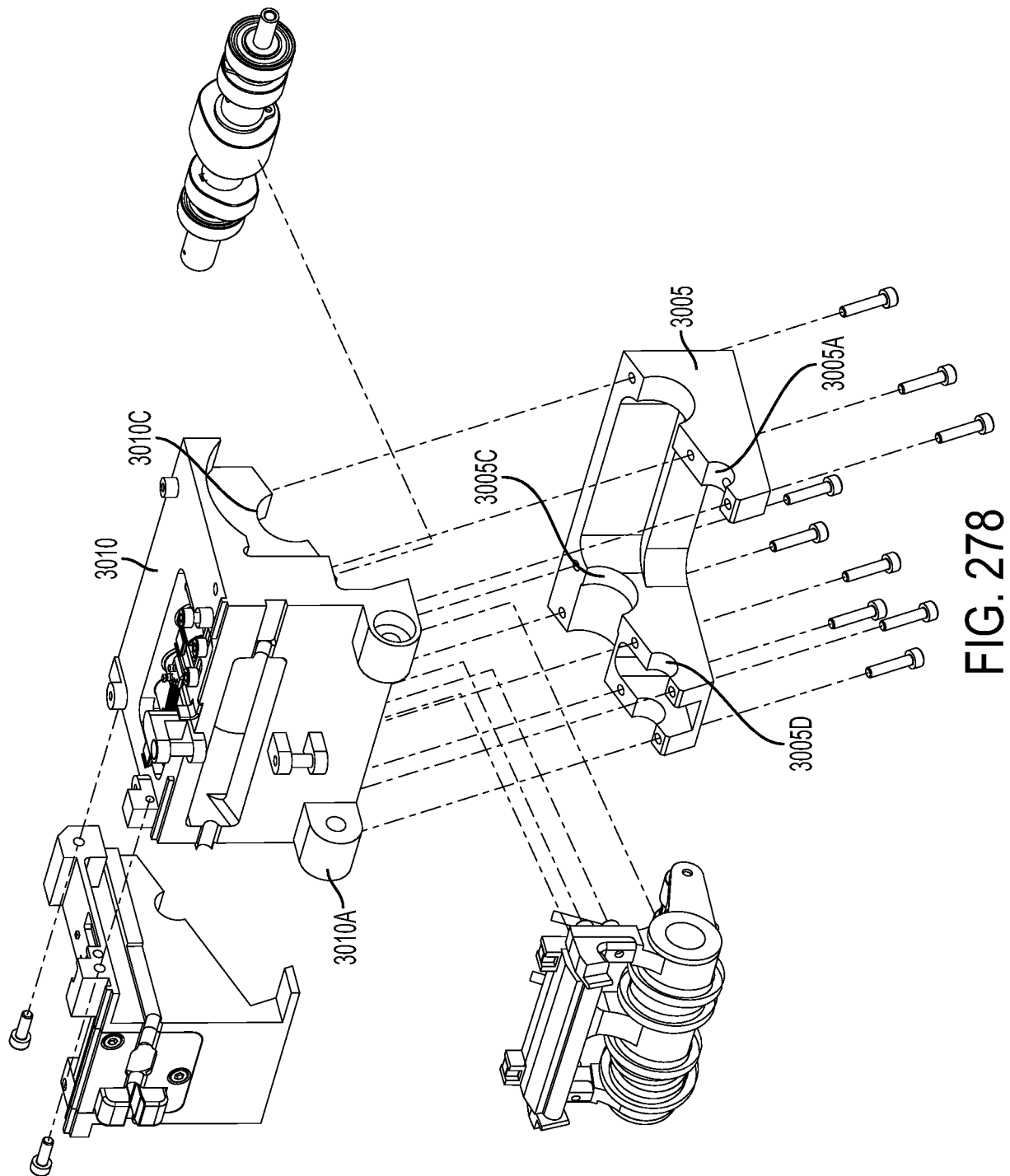


FIG. 278

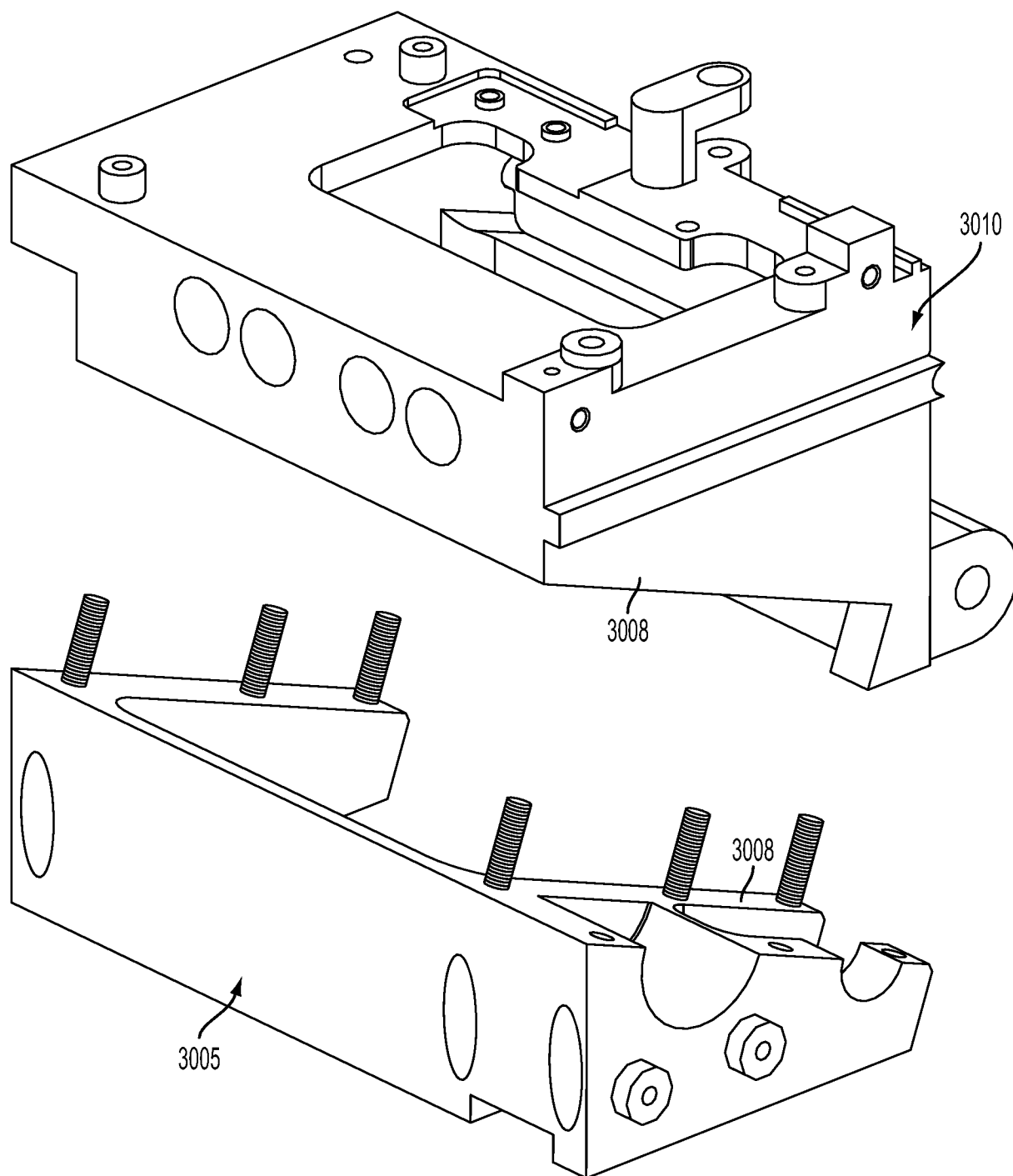


FIG. 279

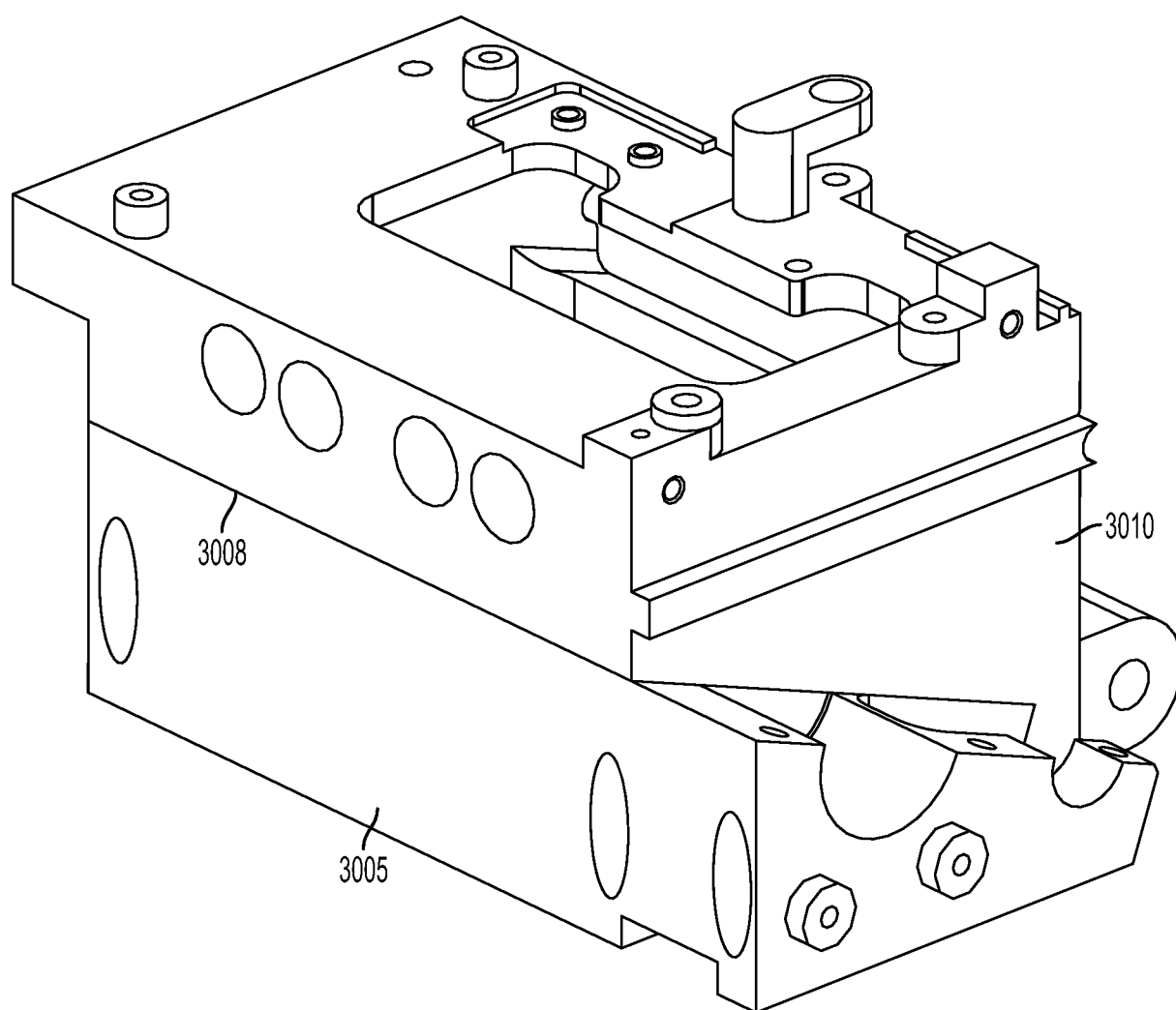


FIG. 280

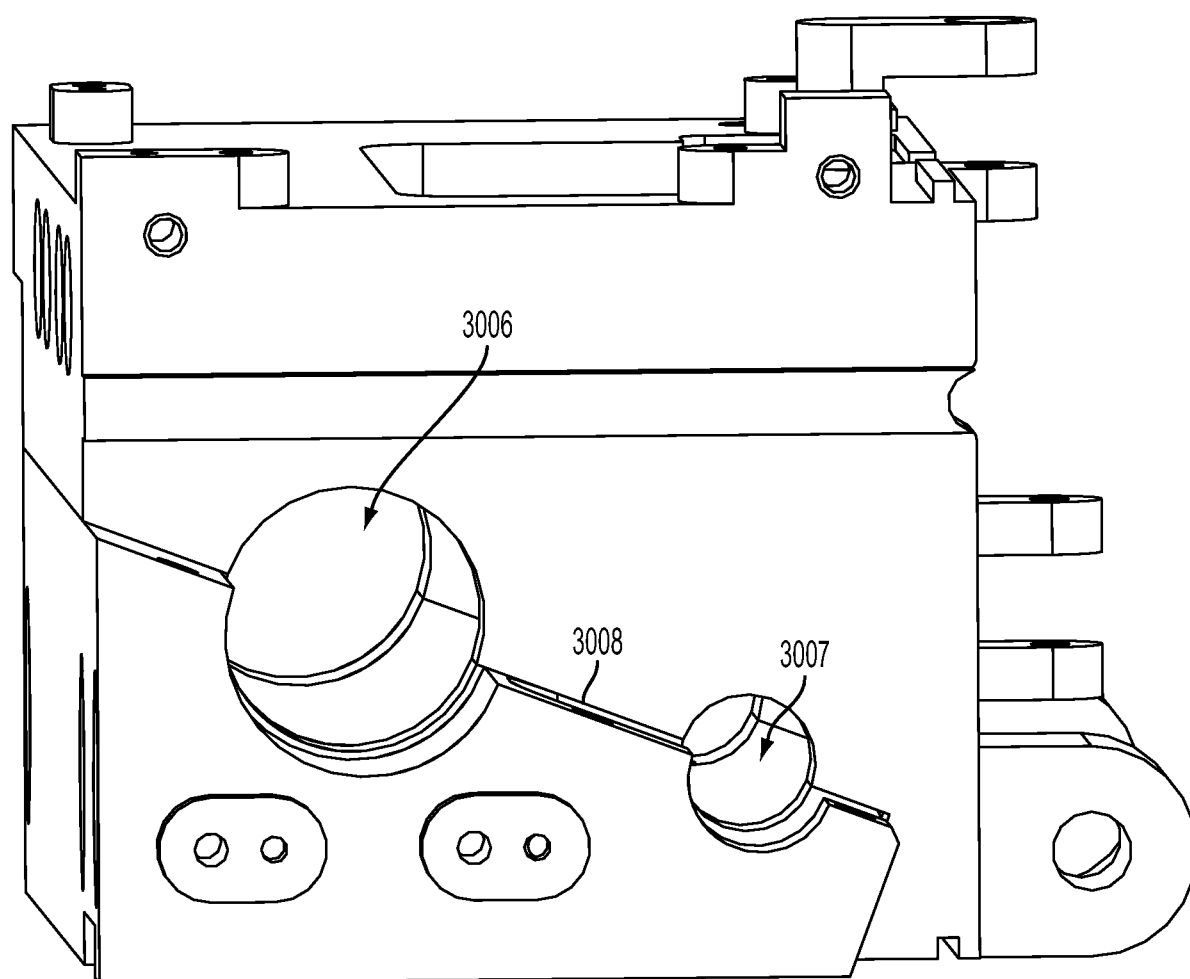


FIG. 281

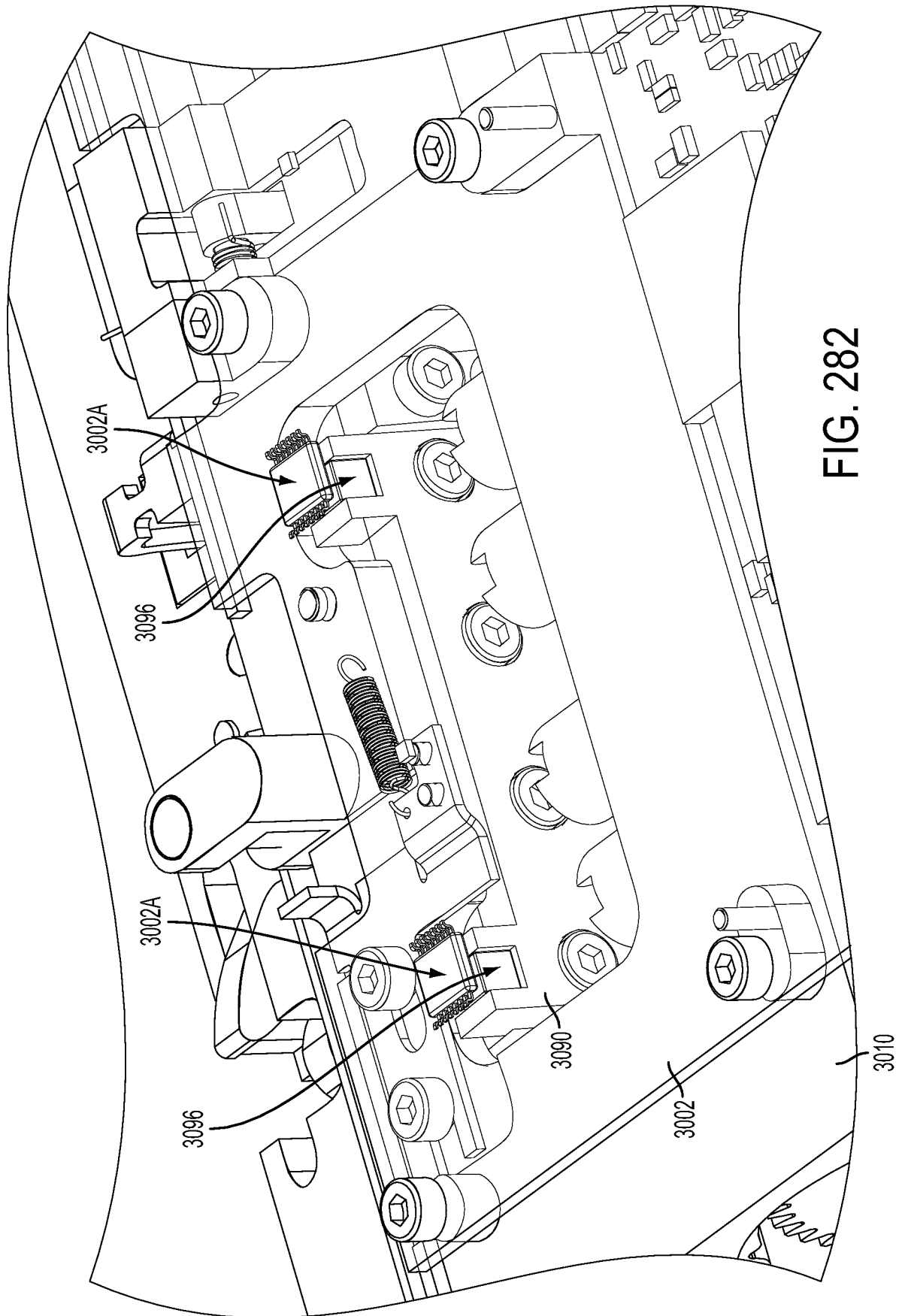
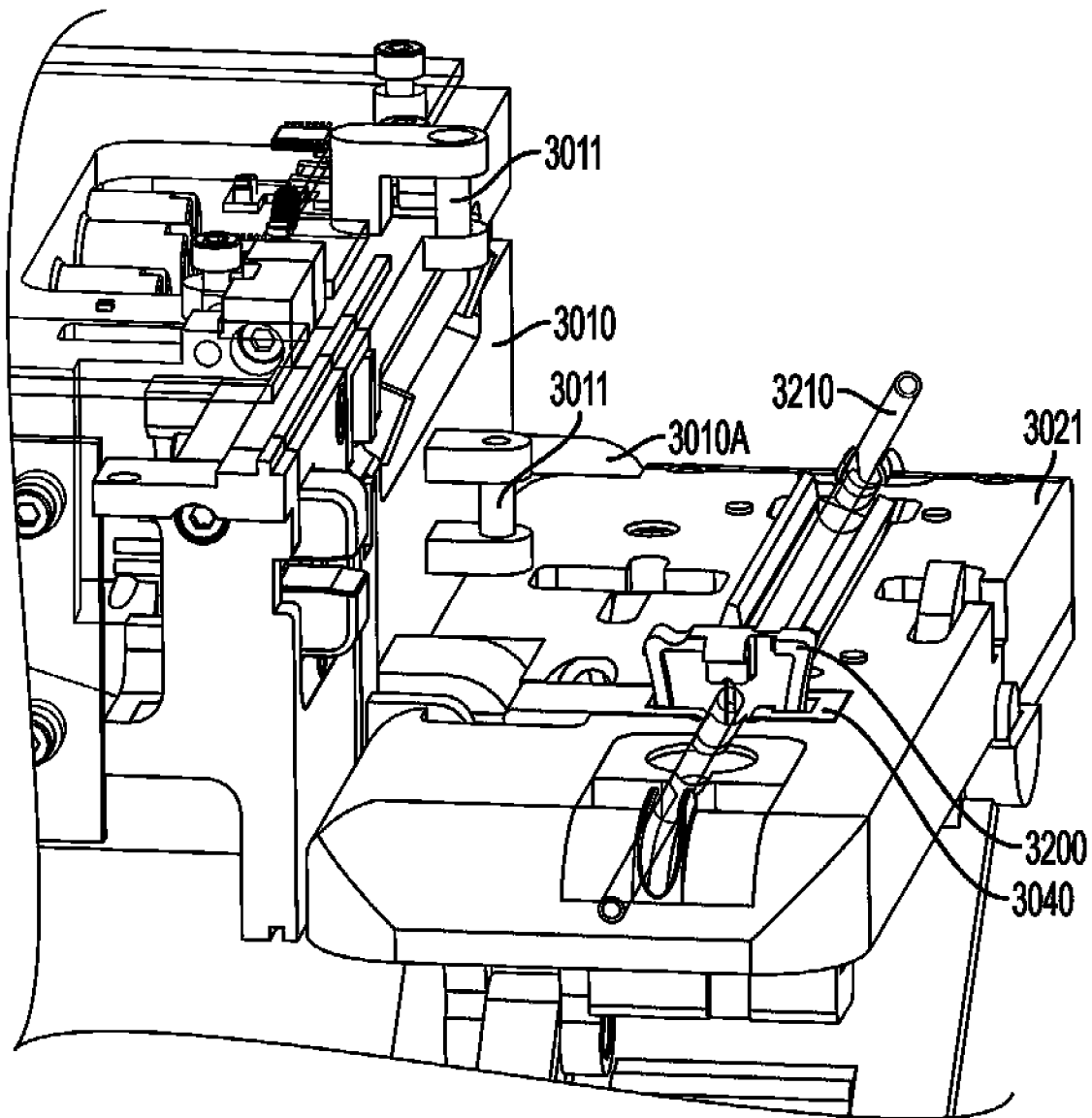


FIG. 282

**FIG. 283**

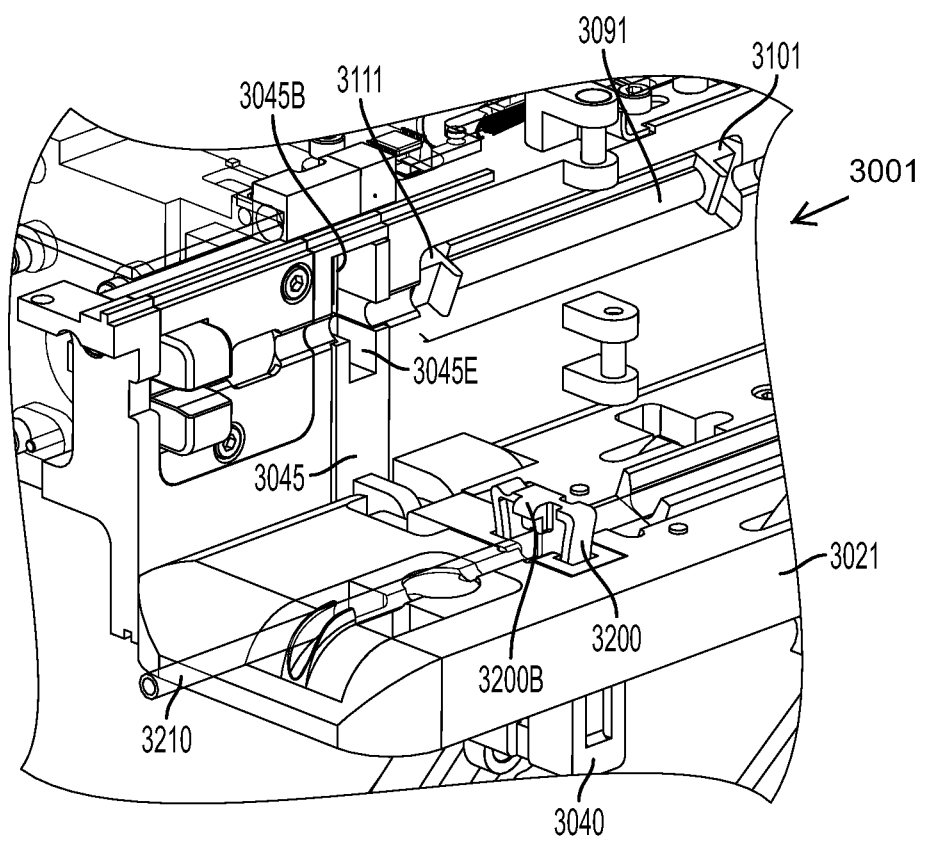


FIG. 284

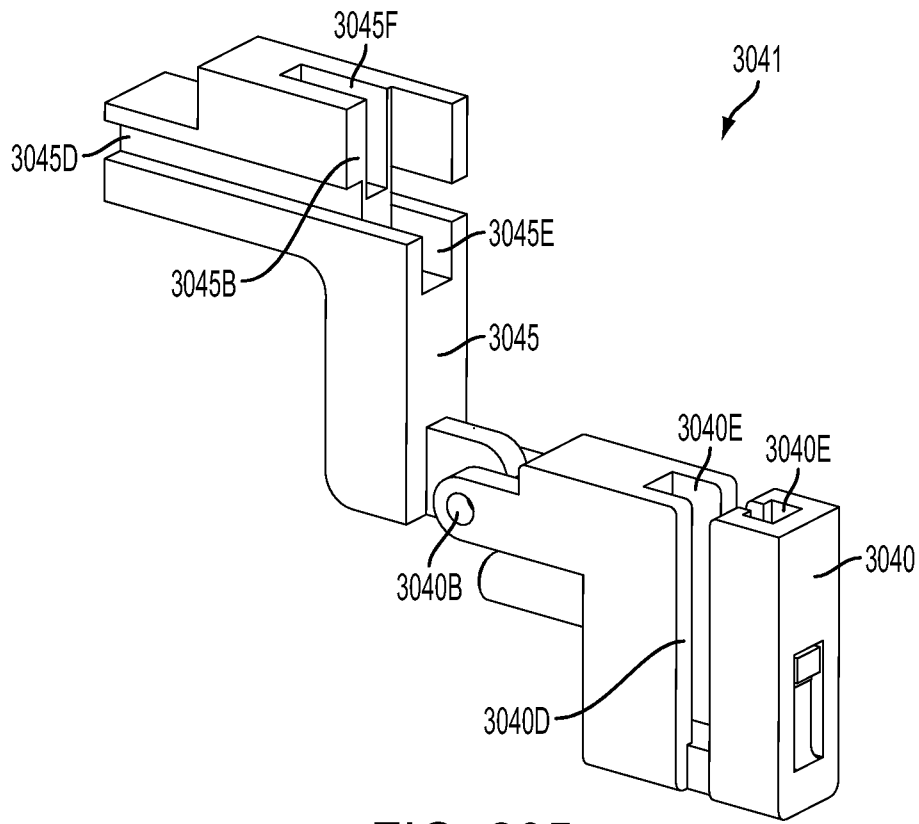


FIG. 285

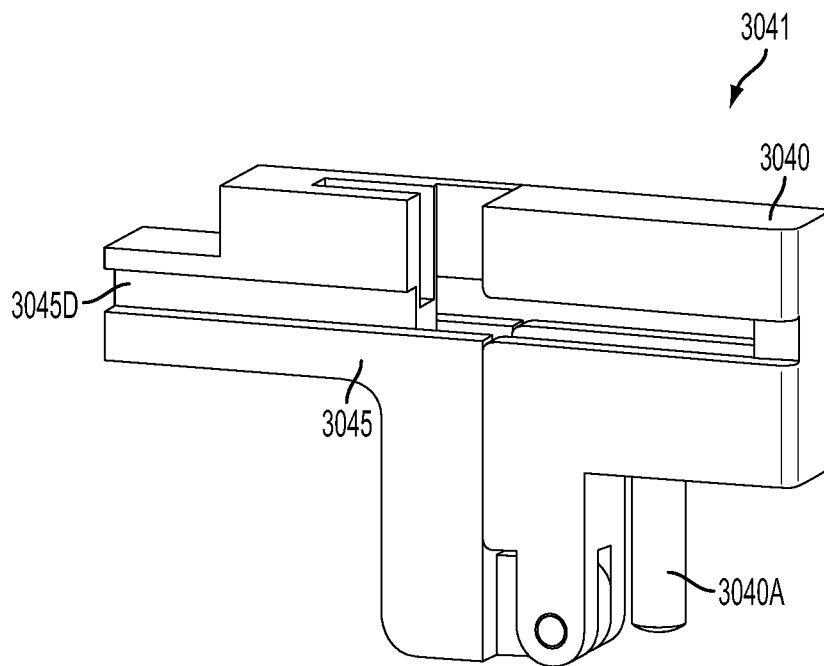


FIG. 286

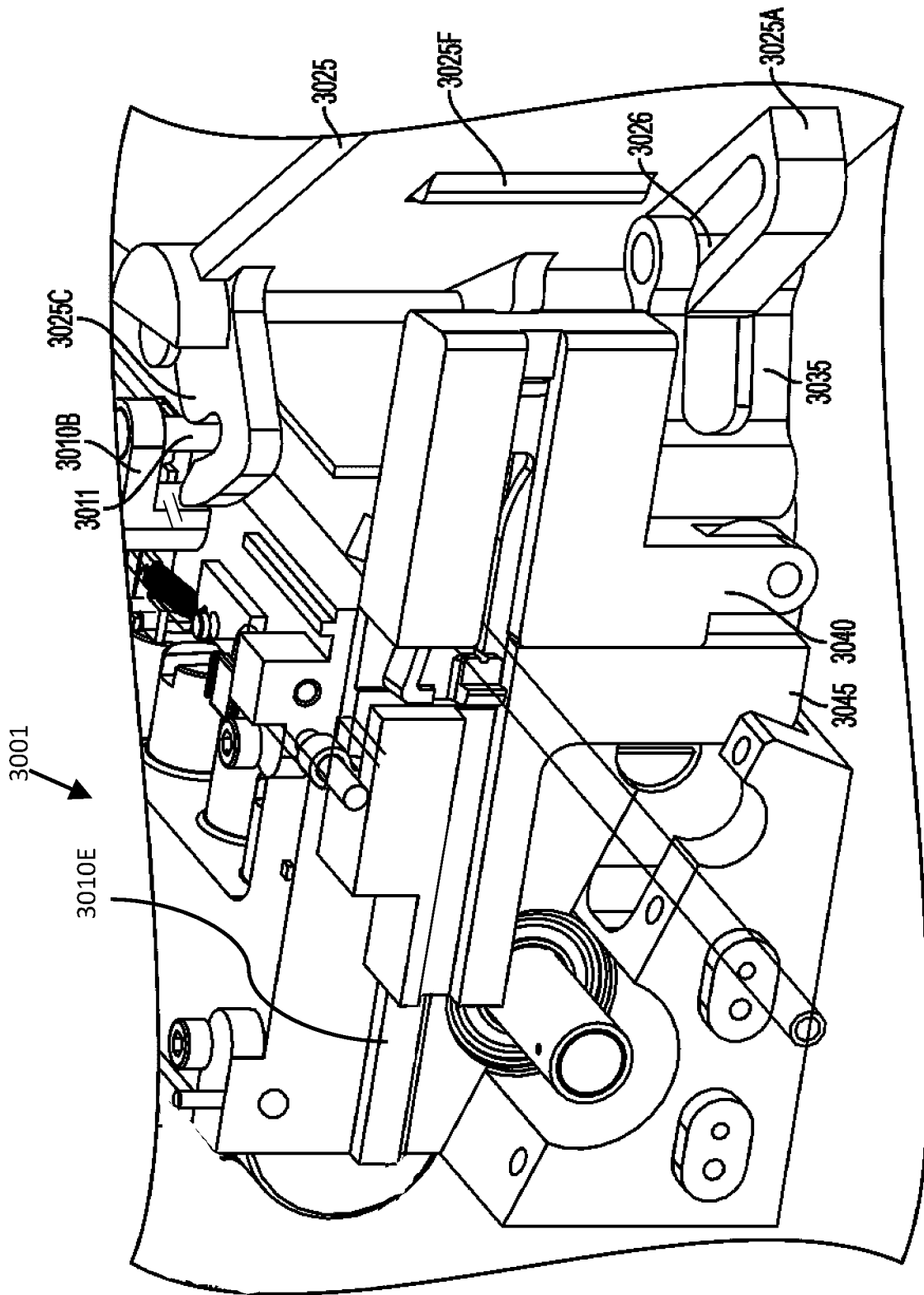


FIG. 287

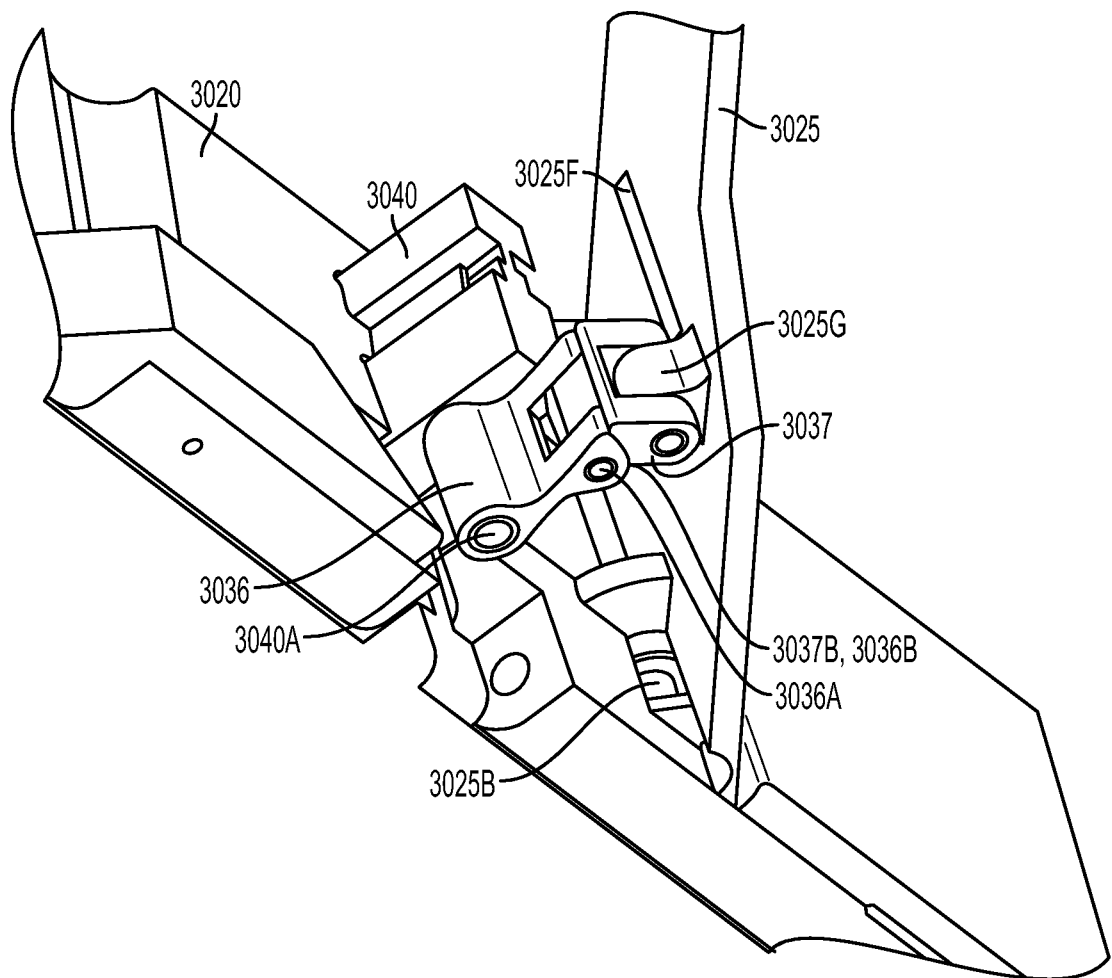


FIG. 288

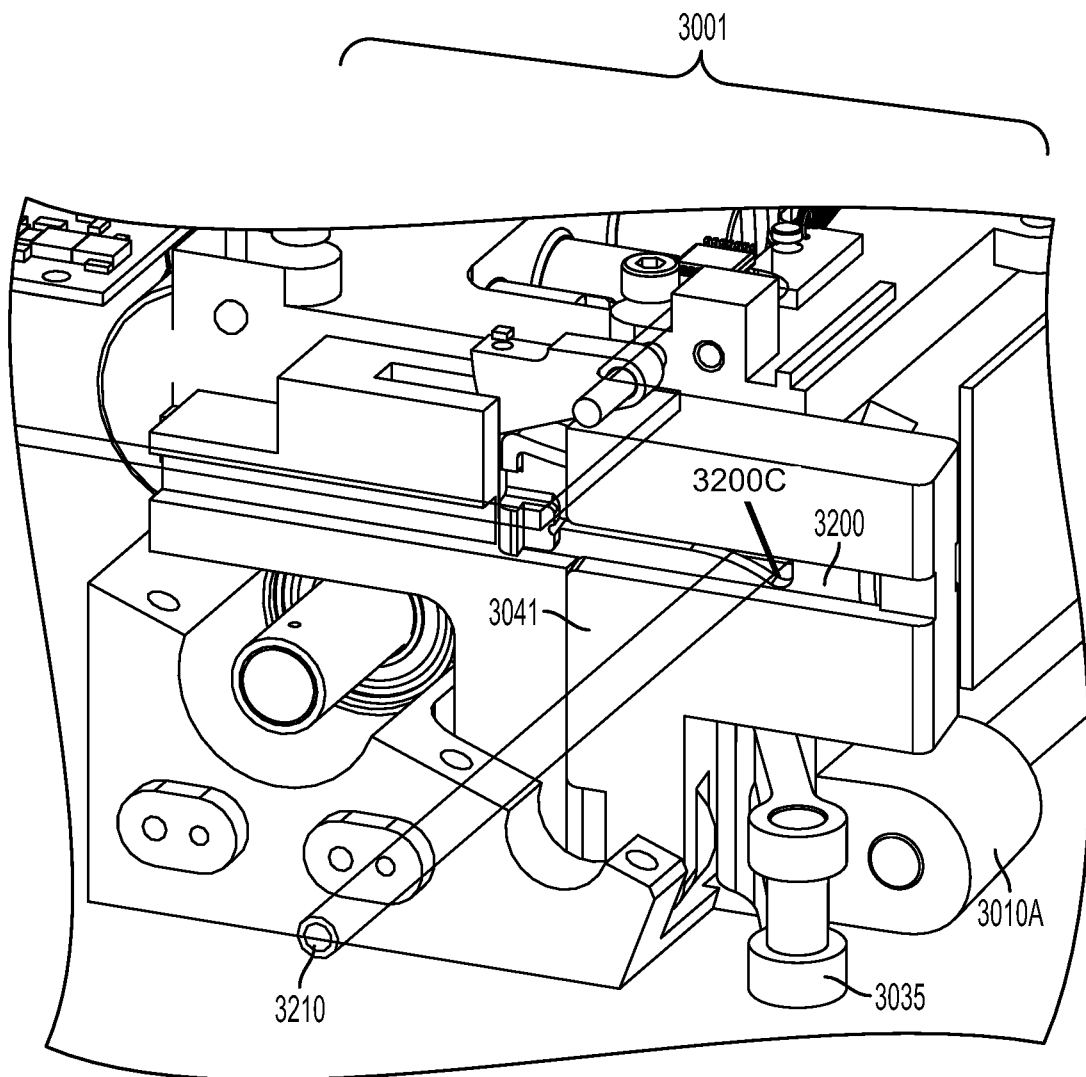


FIG. 289

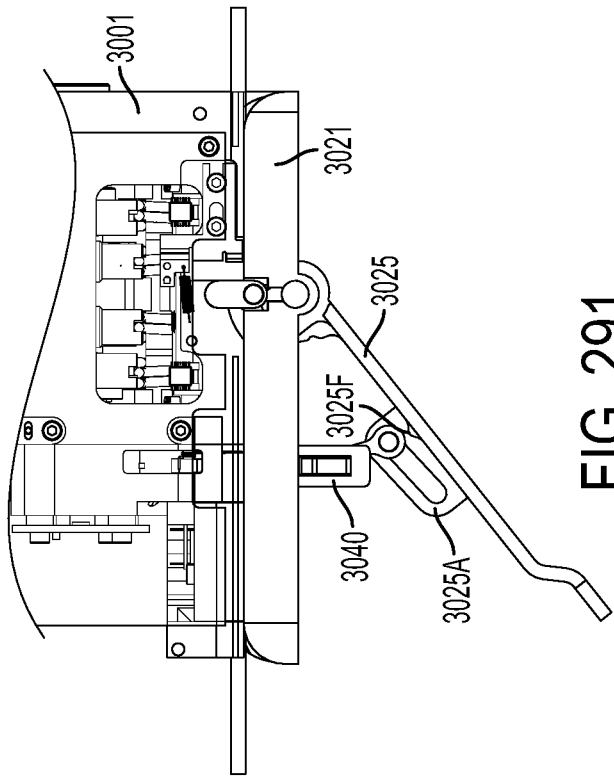


FIG. 291

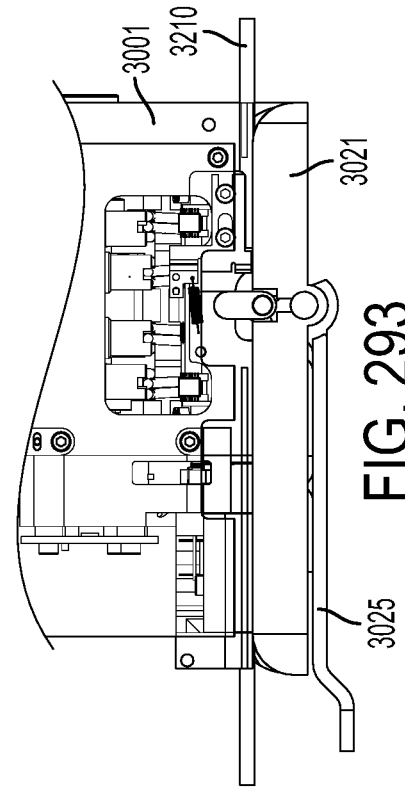


FIG. 293

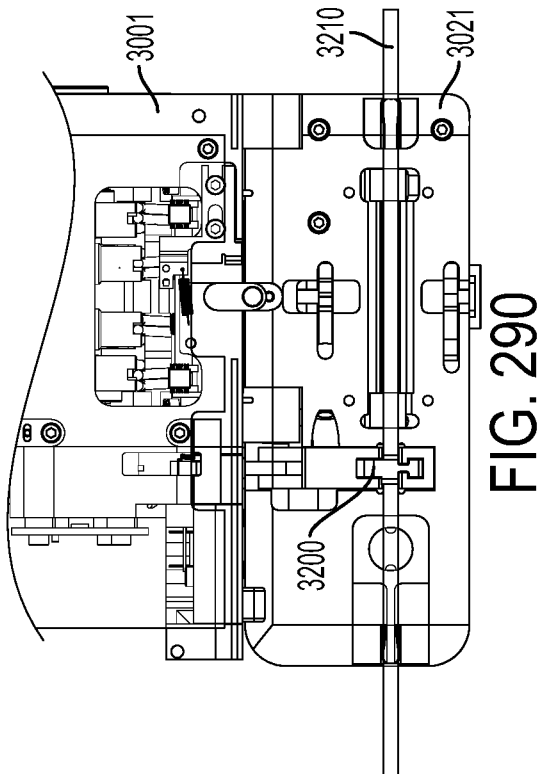


FIG. 290

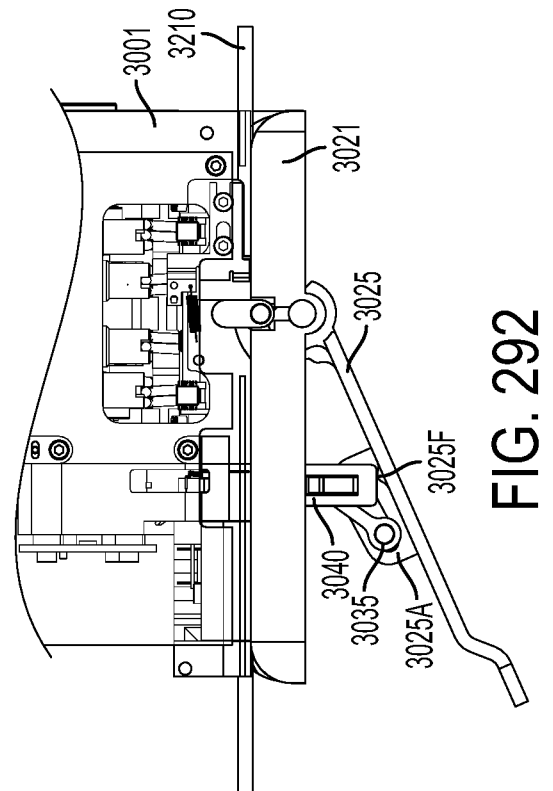


FIG. 292

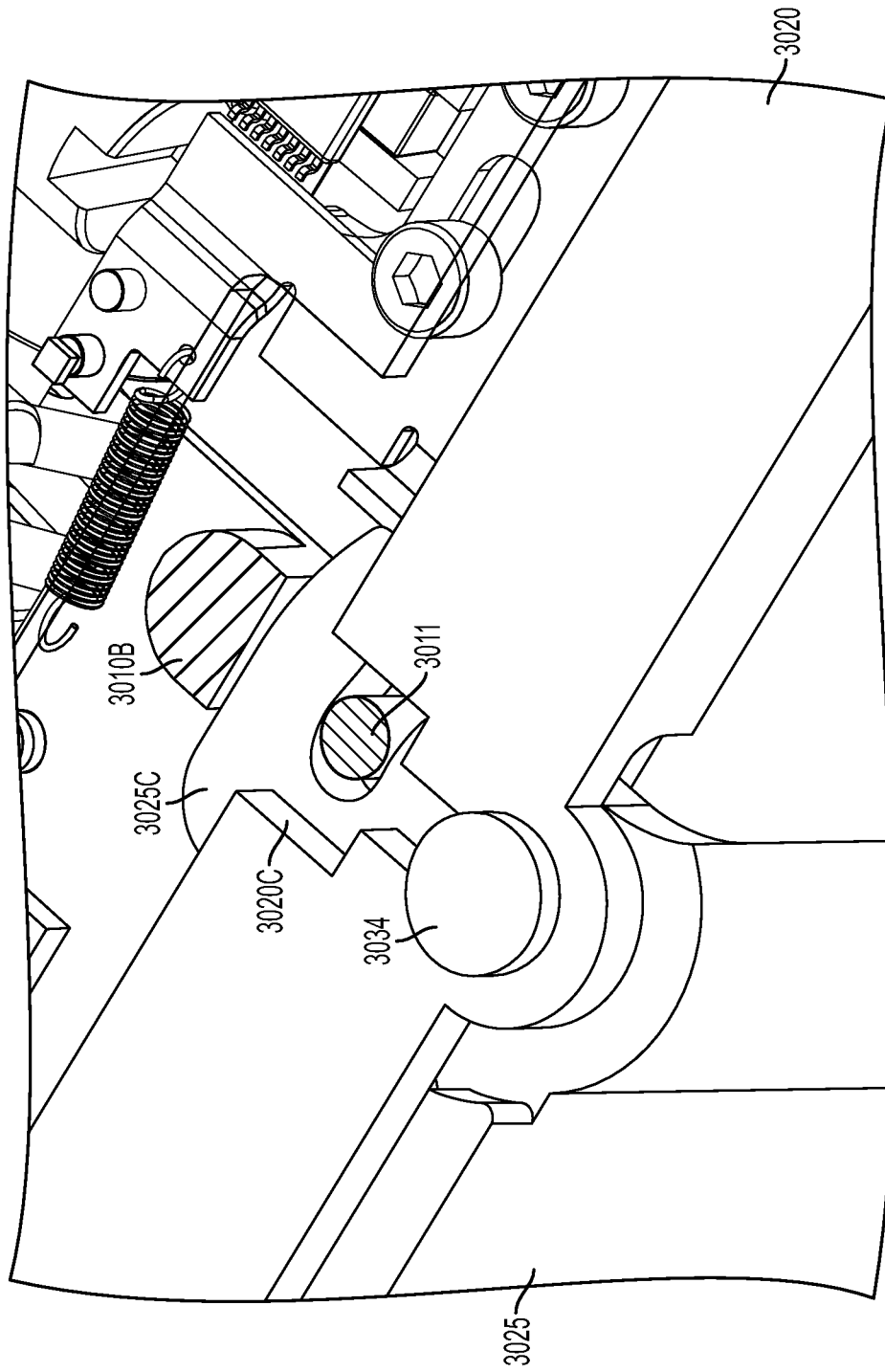


FIG. 294

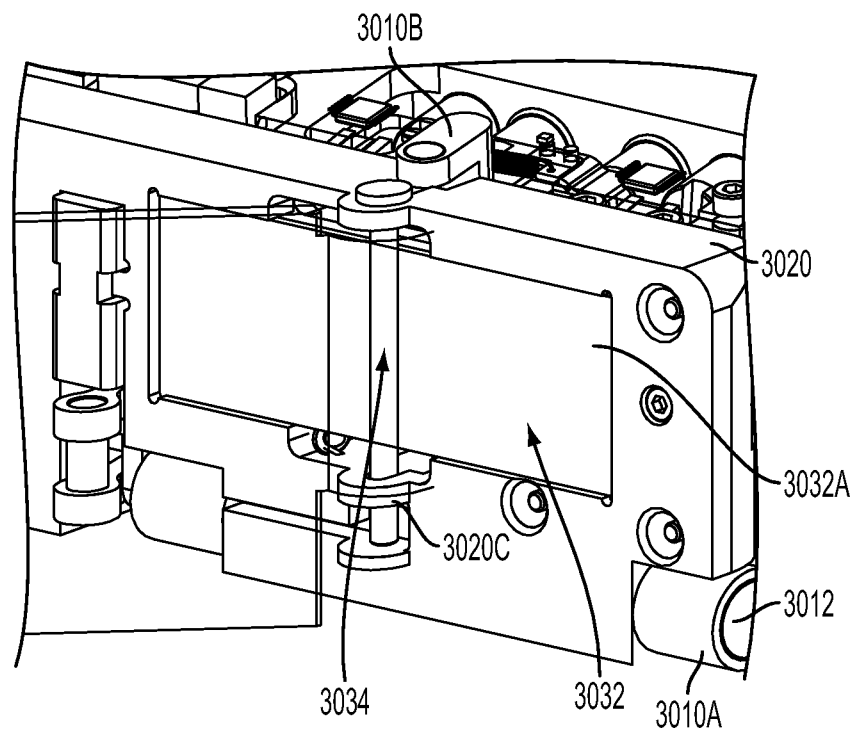


FIG. 295

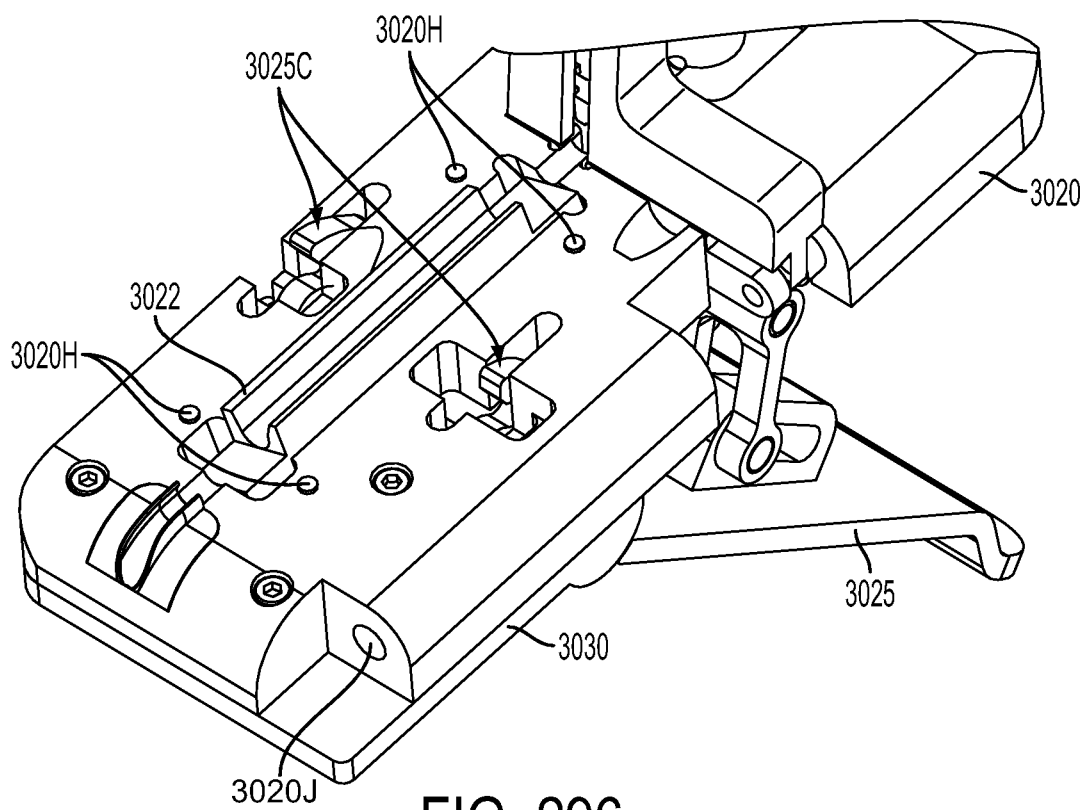


FIG. 296

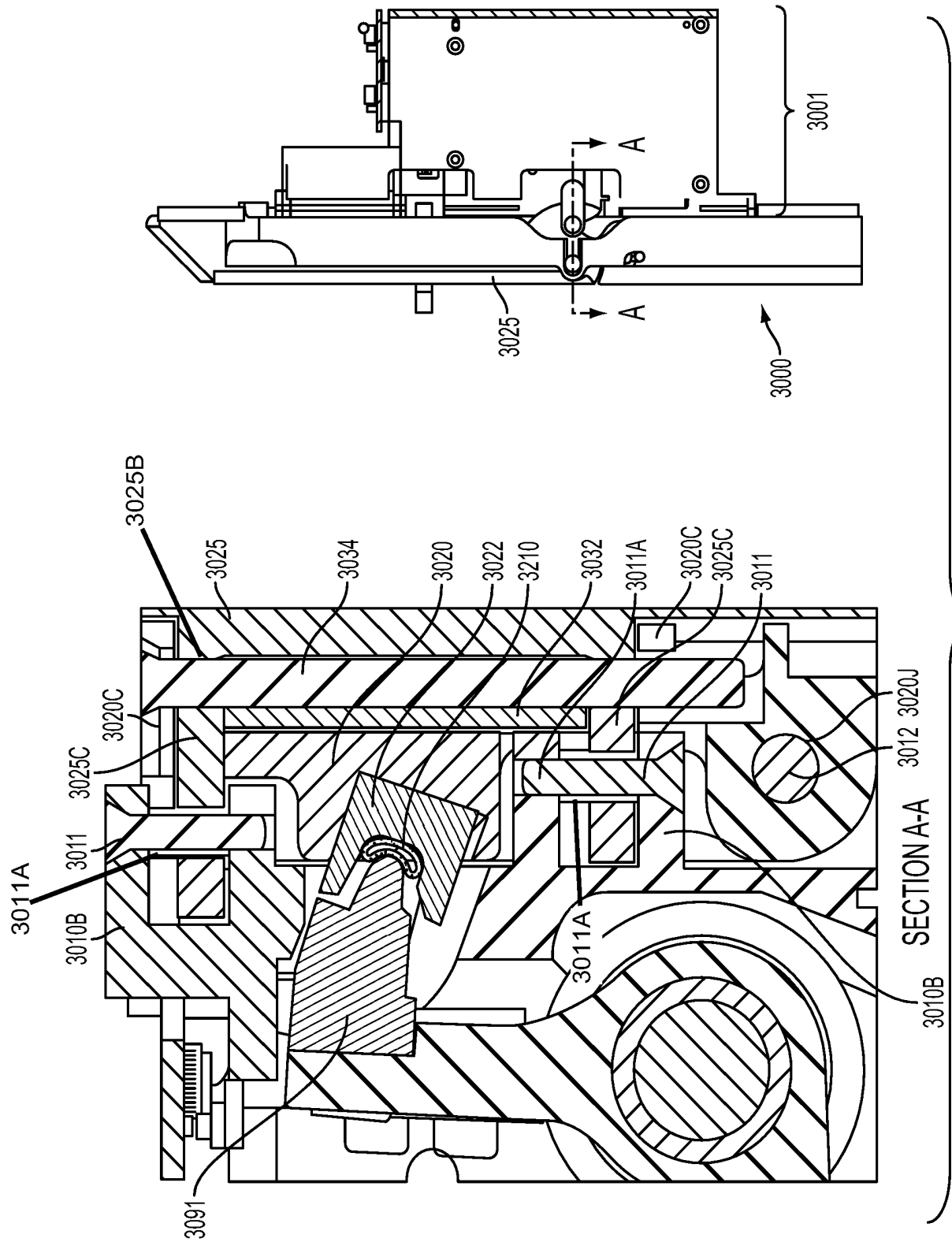


FIG. 297

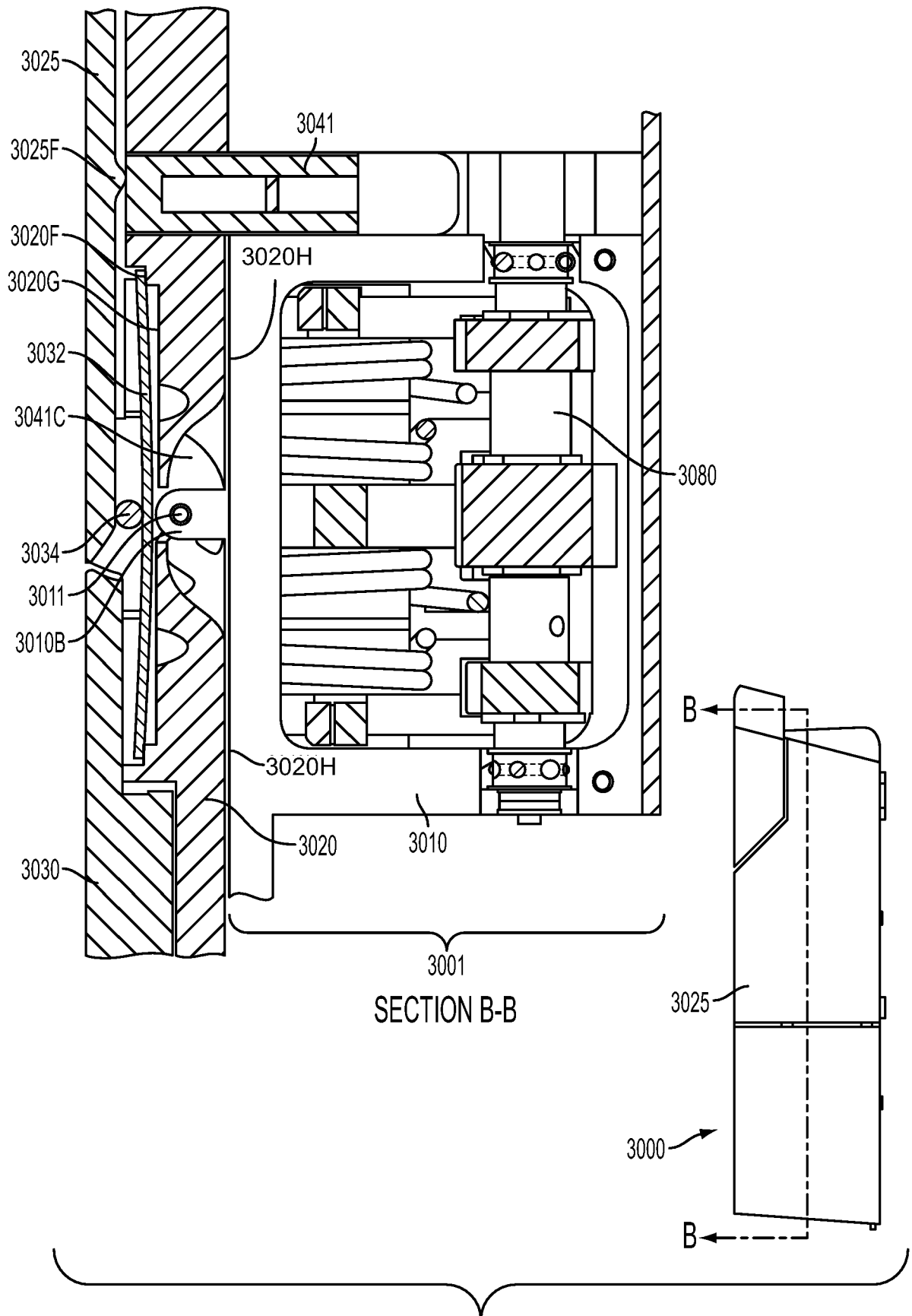


FIG. 298

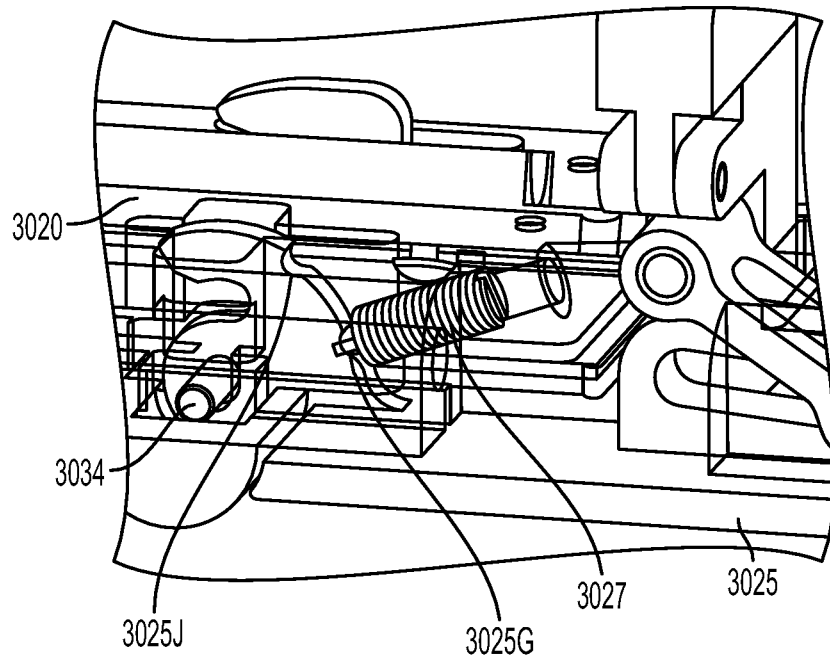


FIG. 299

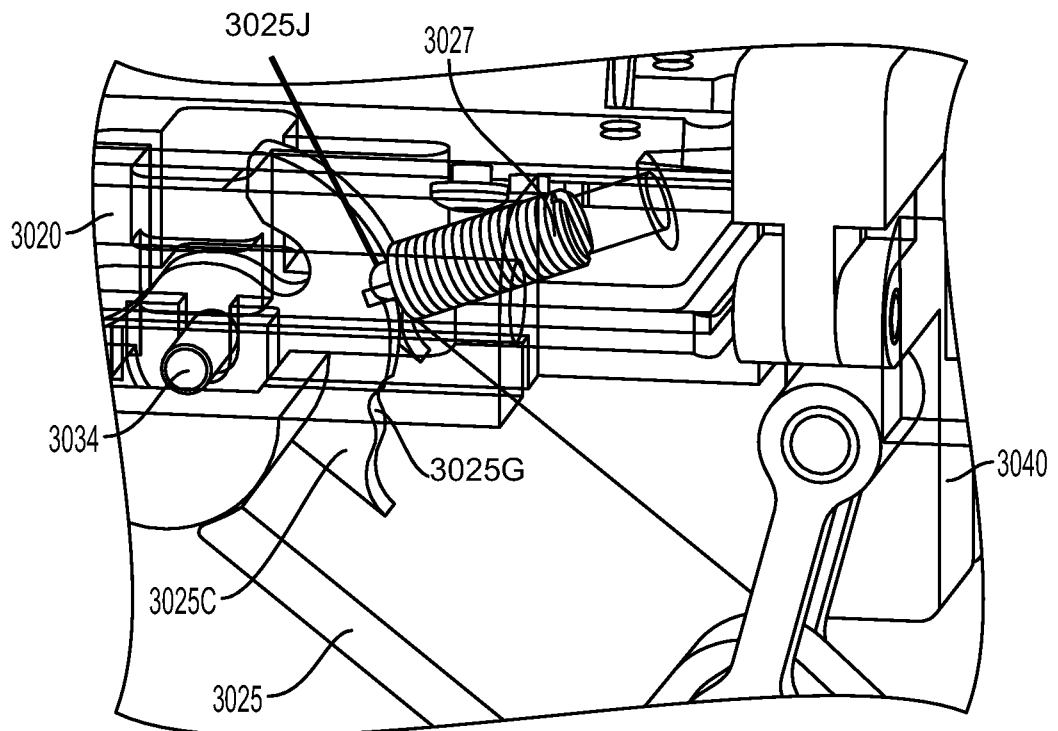


FIG. 300

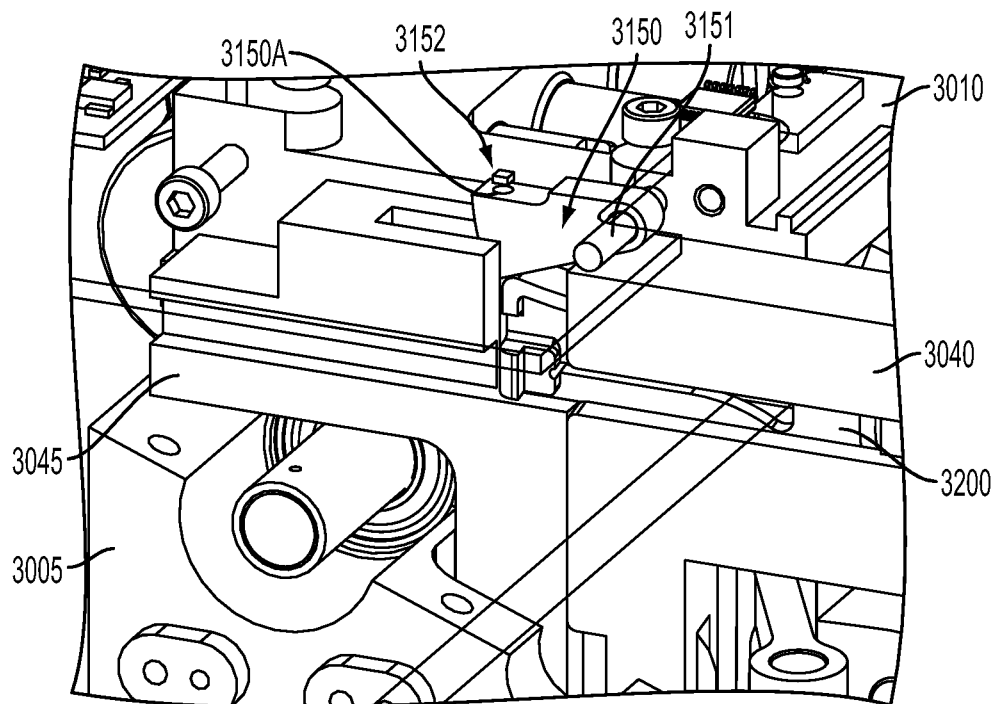


FIG. 301

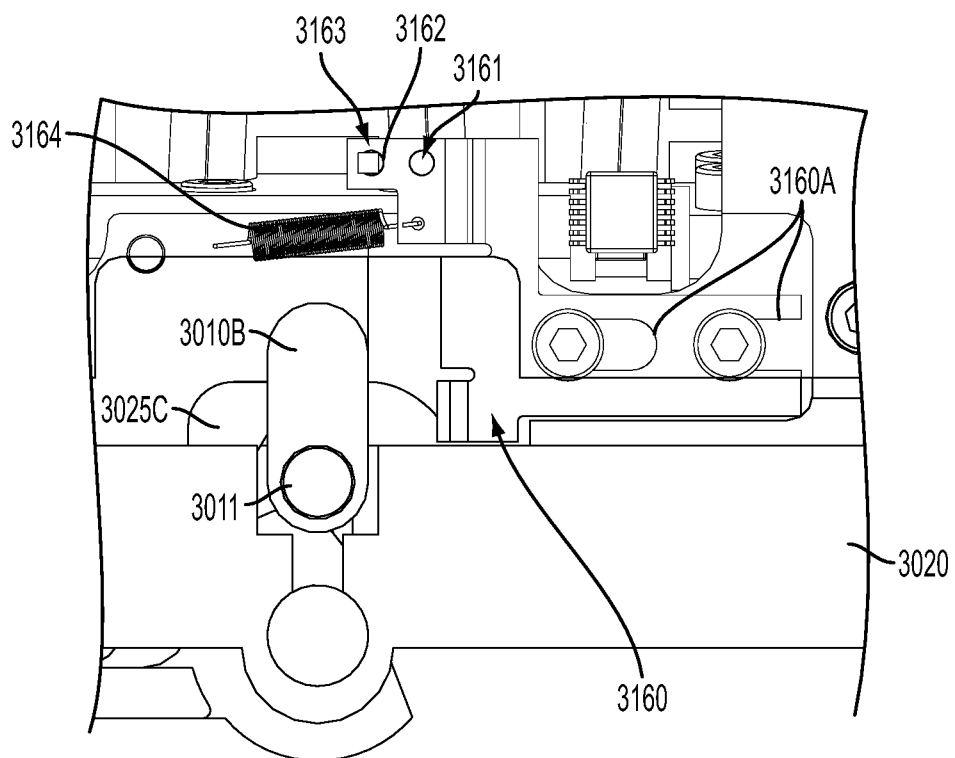


FIG. 302

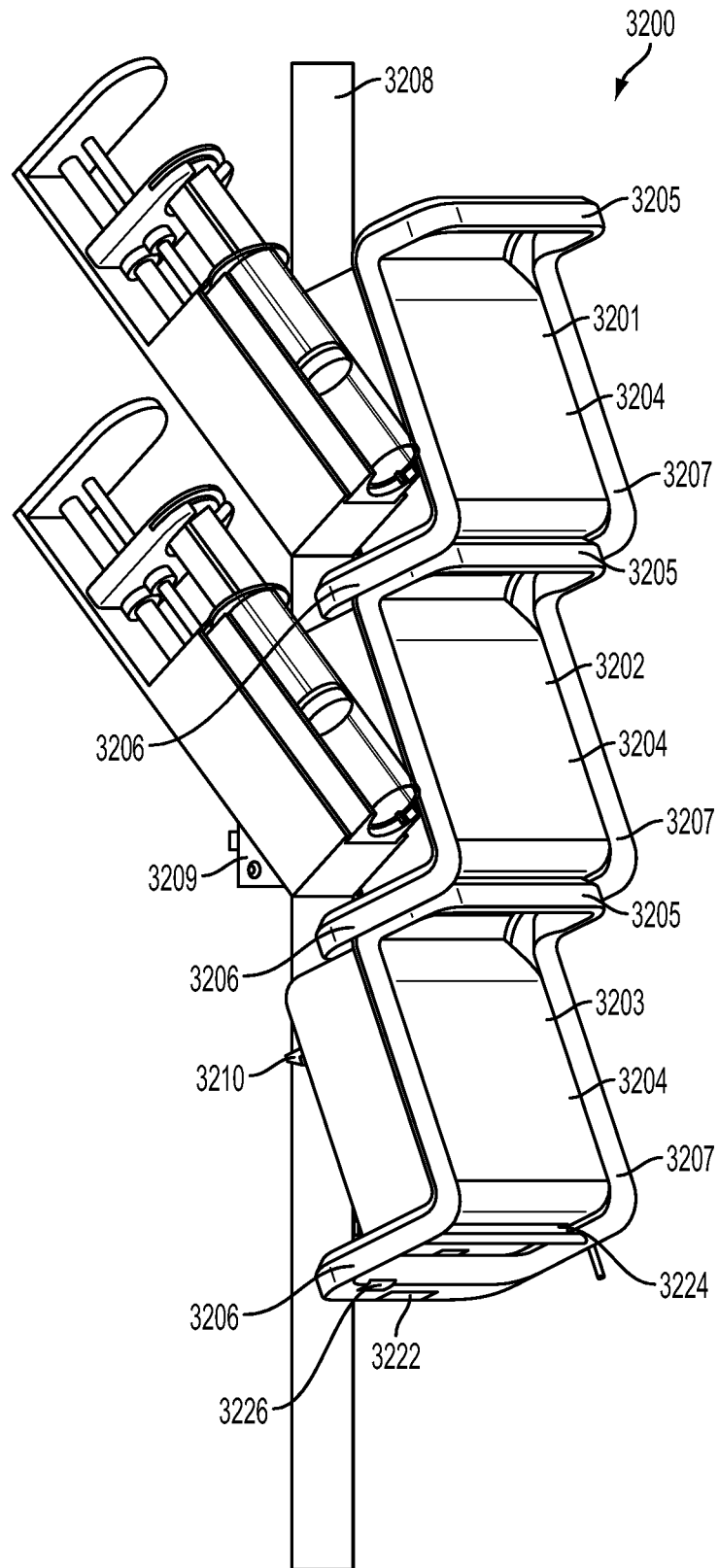


FIG. 303

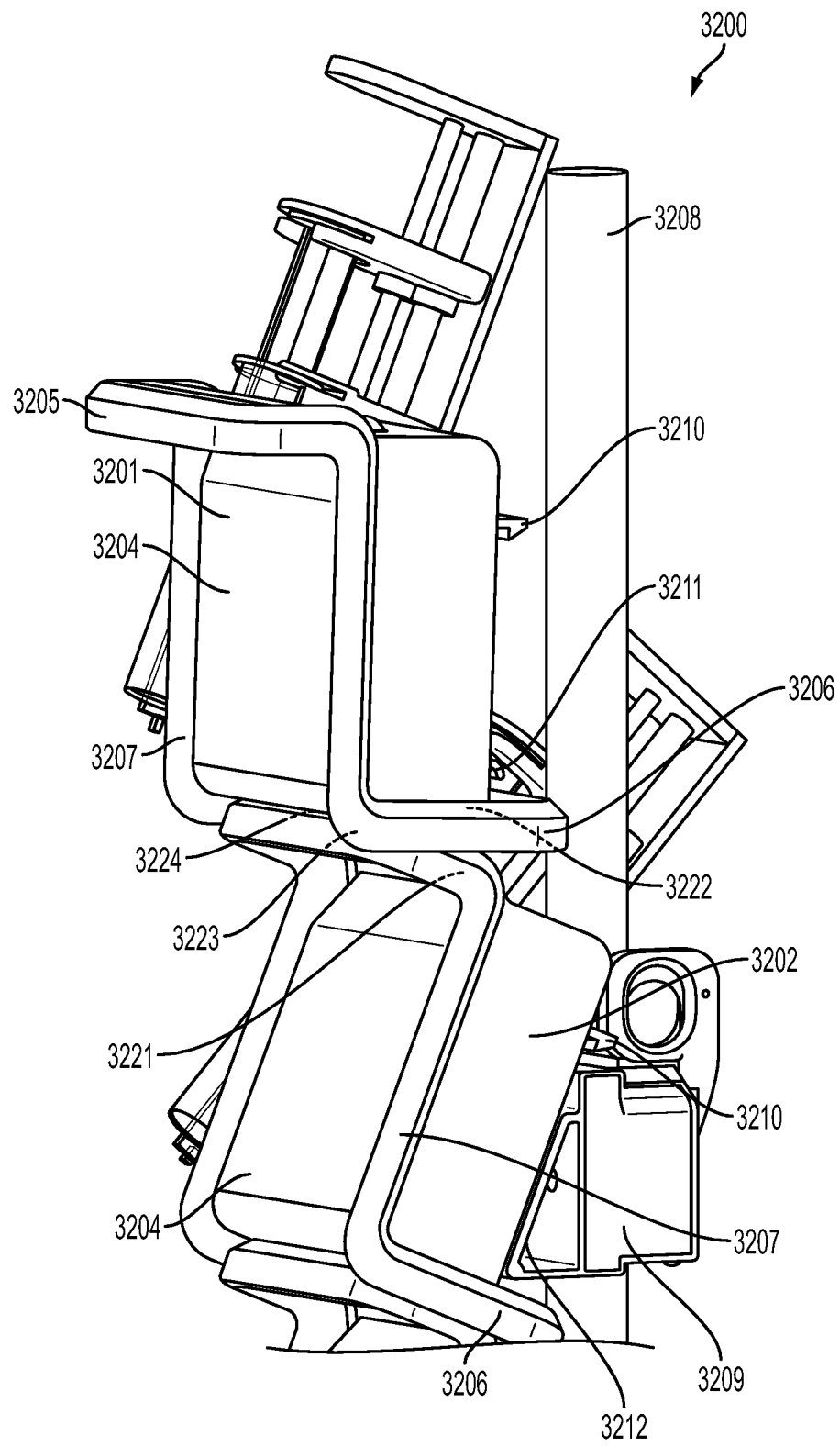


FIG. 304

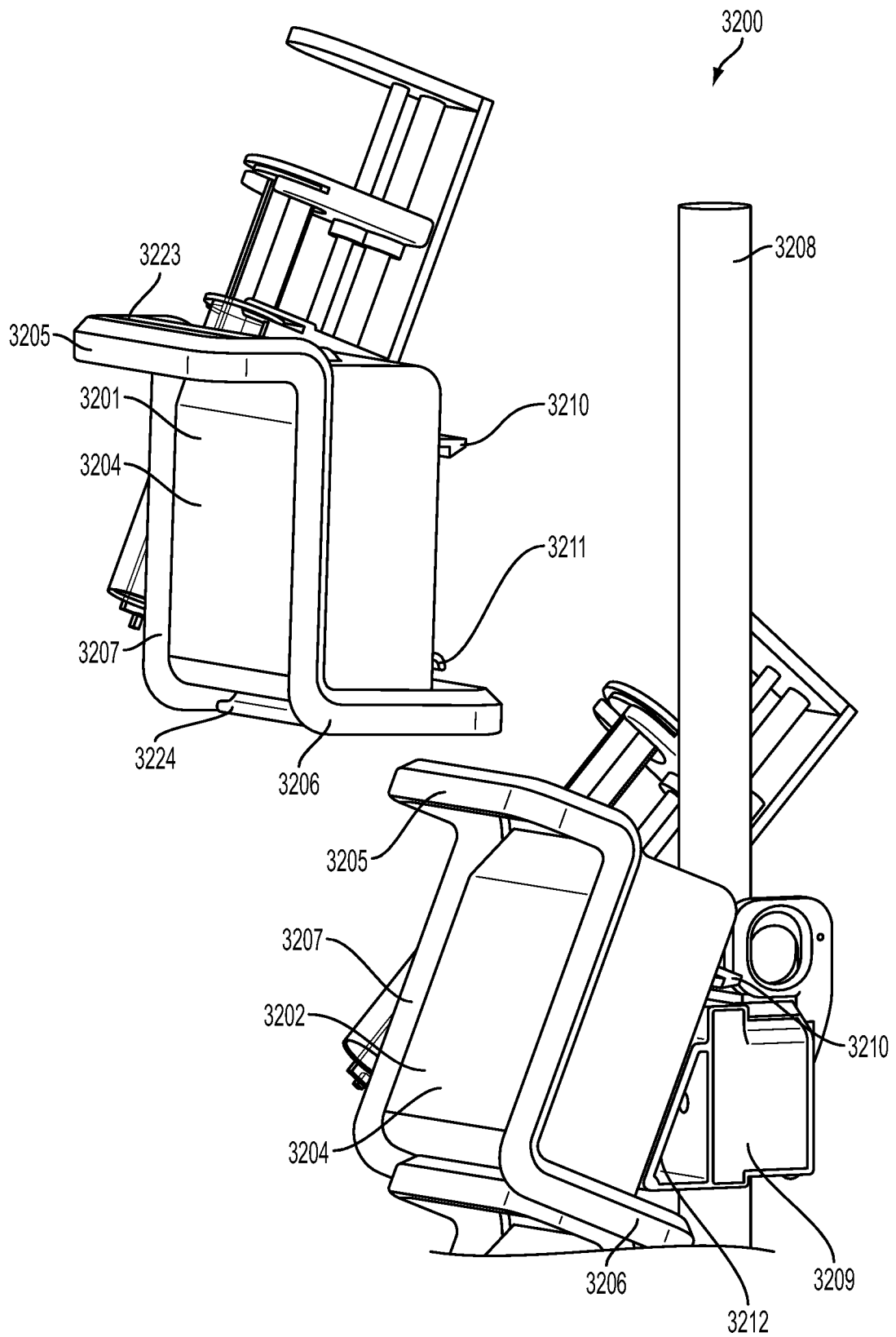


FIG. 305

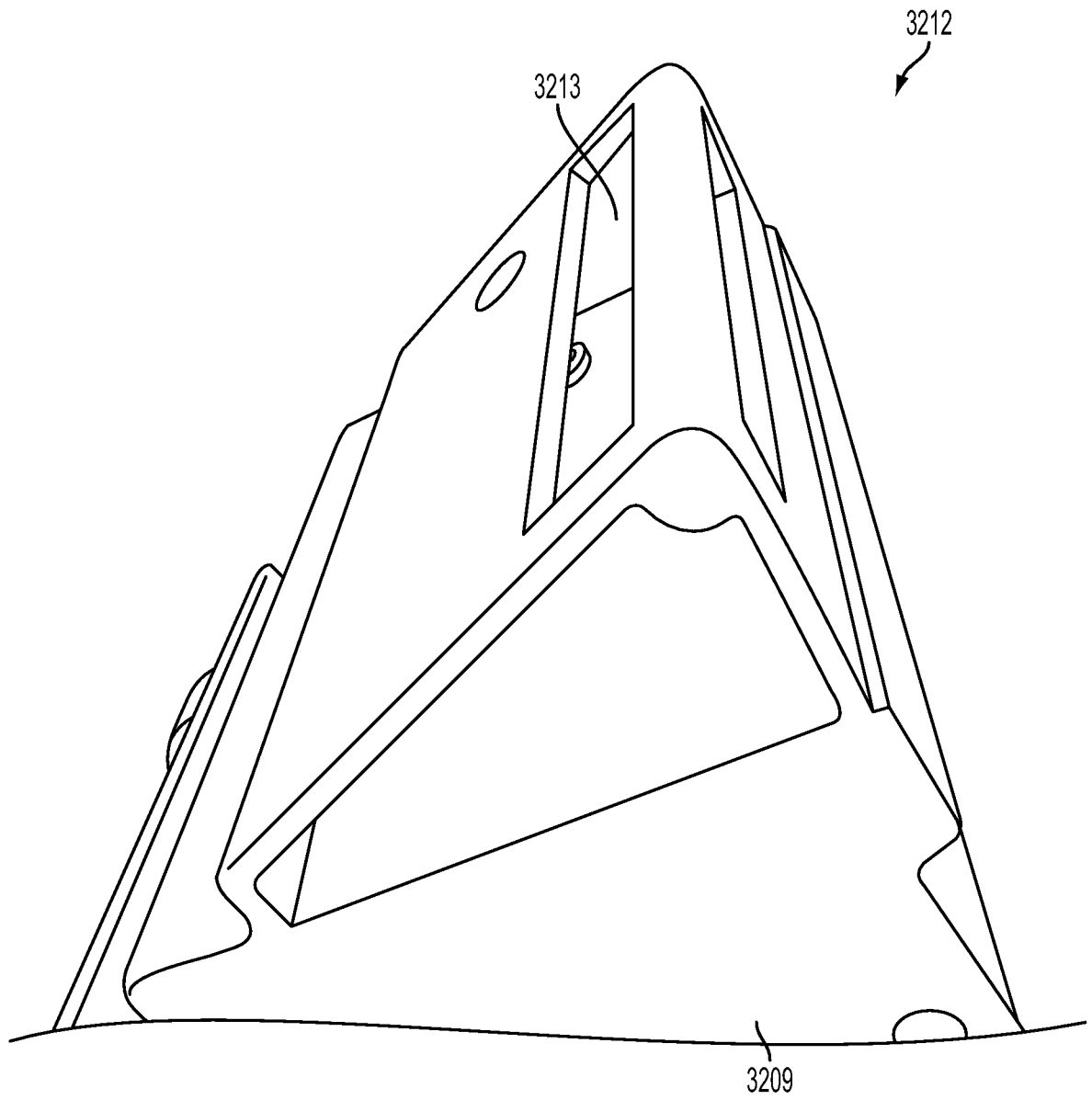


FIG. 307

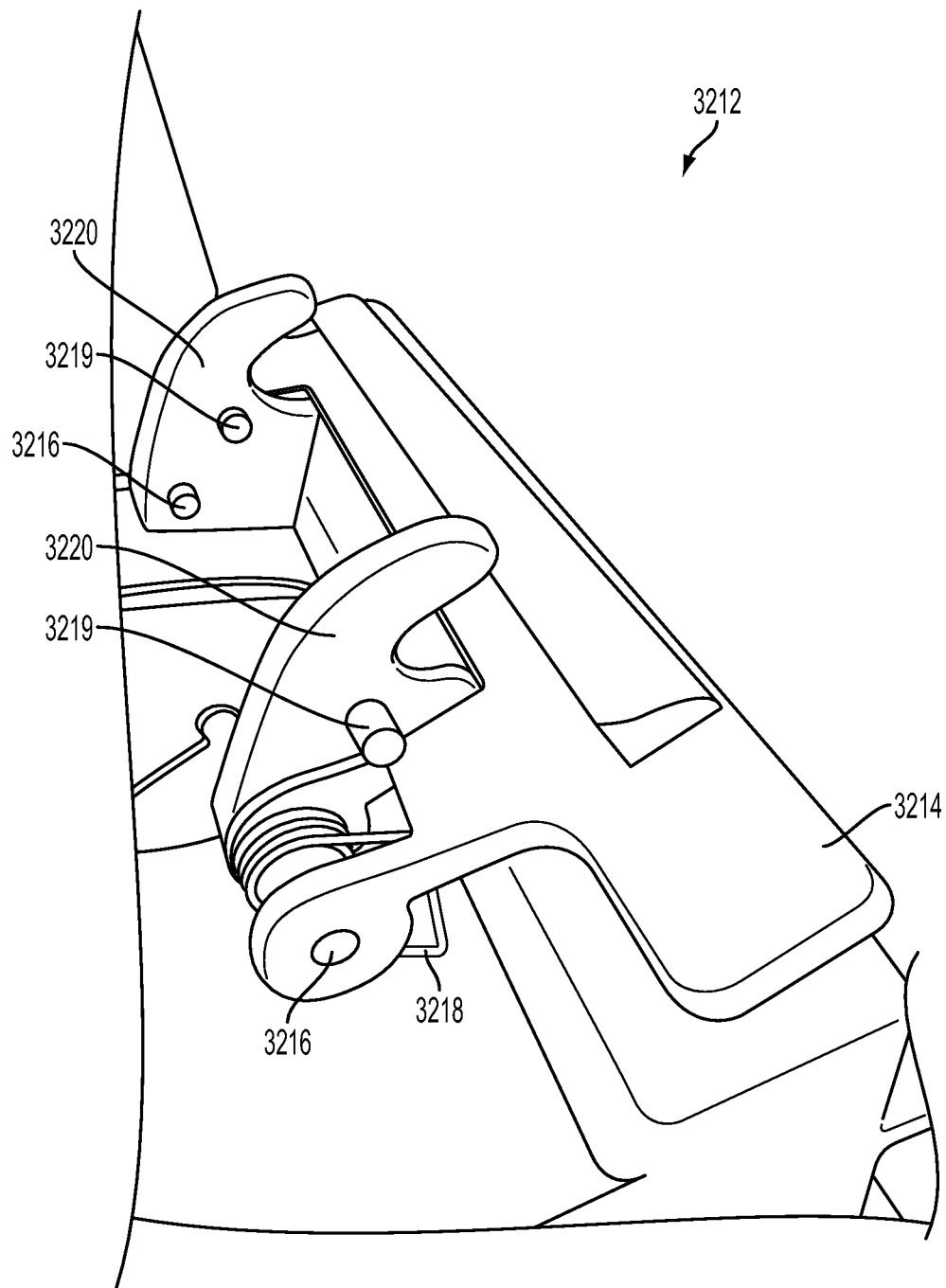


FIG. 308

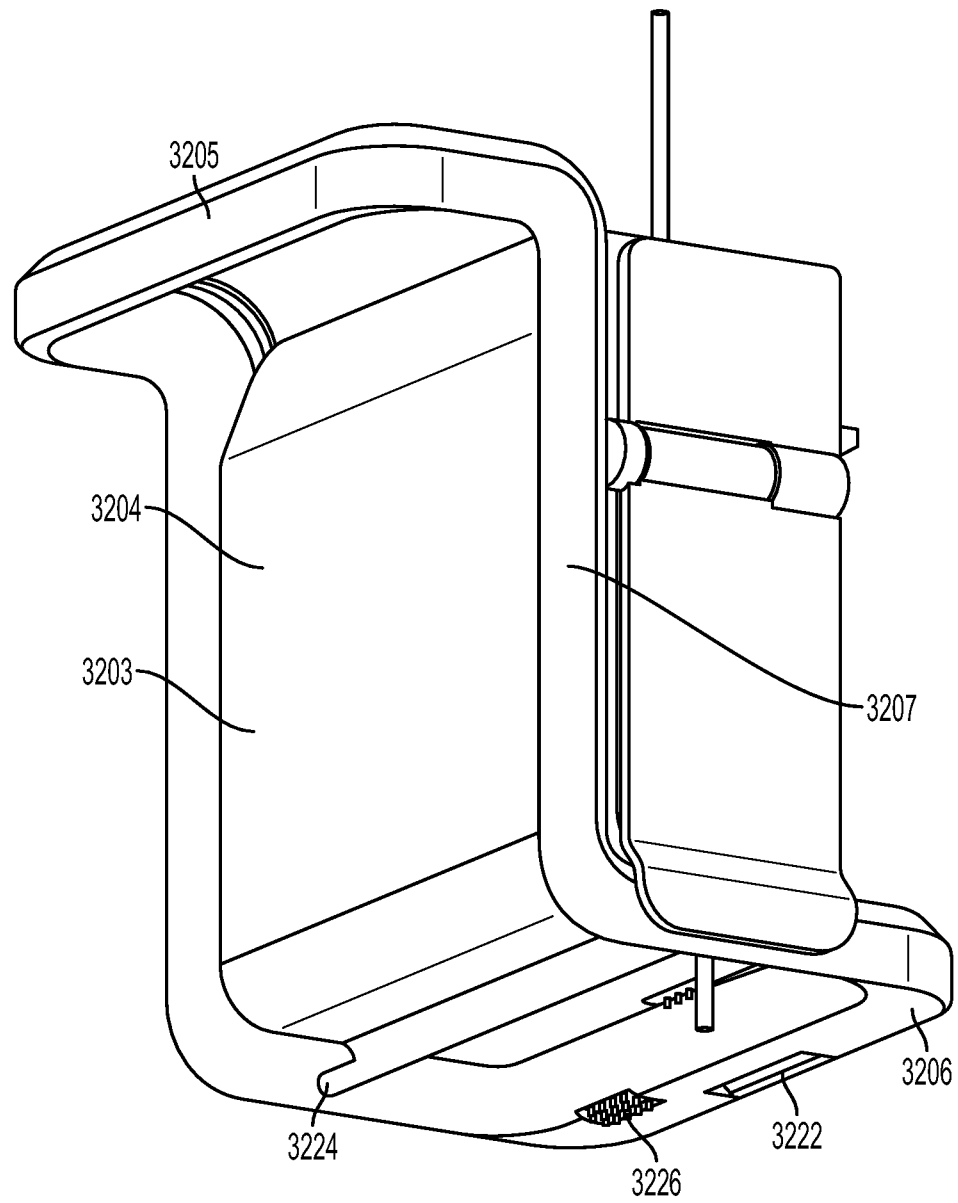


FIG. 309

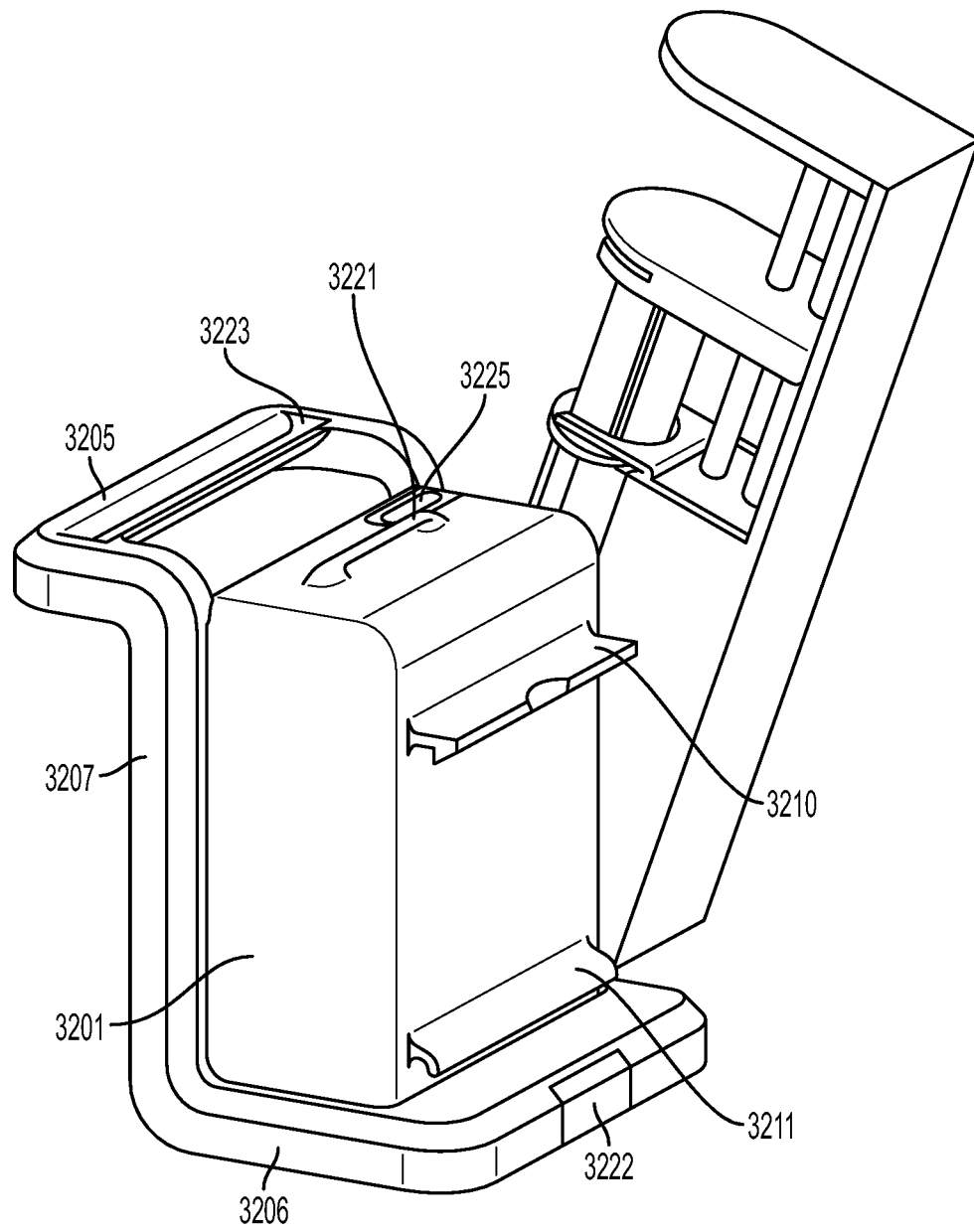


FIG. 310

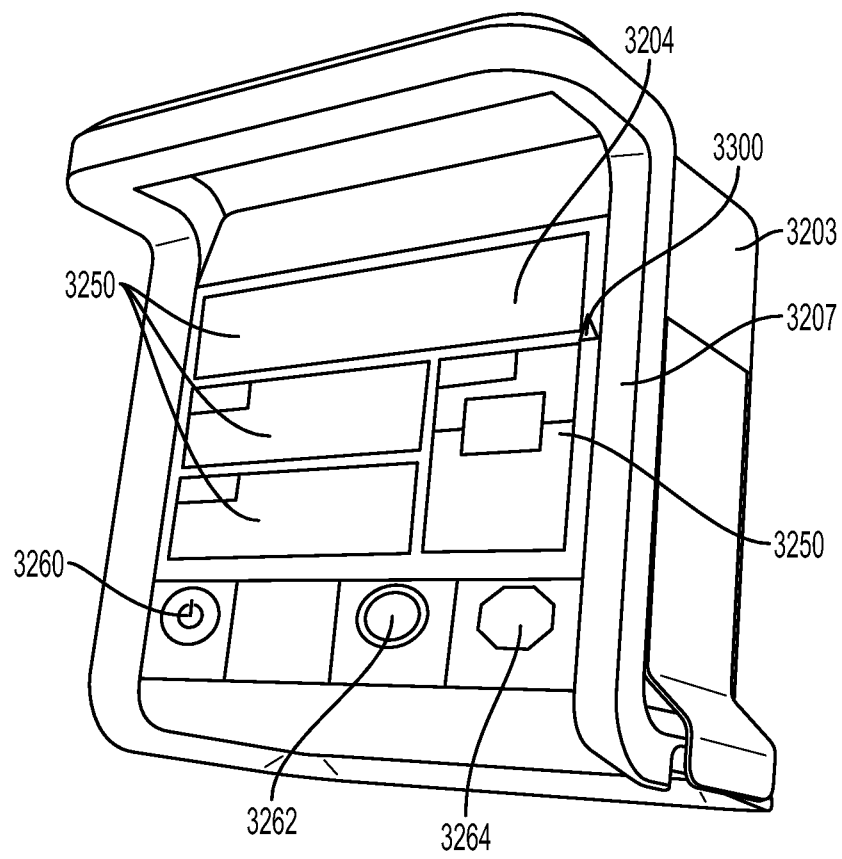


FIG. 311

3300

MEDICATION: 0.9% NORMAL SALINE 3302

IN CONTAINER: 3304 DRUG AMOUNT 3304 / 3306 TOTAL VOLUME mL

CONCENTRATION: 3308 3304 3306

DOSE: 3310 3310

RATE: 3312 125 mL/hr

VTBI: 3314 1000 mL 3316

TIME: 3316 8 hrs 0 min

FIG. 312

3300

3304

MEDICATION: 3302

IN CONTAINER: 3304 / mL

CONCENTRATION: 3308 3306 3308

DOSE RATE: 3318 3318

RATE: 3312 mL/hr

VTBI: 3314 mL 3316

TIME: 3316 hrs min

FIG. 313

3300

3304

MEDICATION: VANCOMYCIN 3302

IN CONTAINER: 3304 1 g / 250 mL 3306

CONCENTRATION: 3308 4.0 mg/mL 3308

DOSE: 3310 1000 mg 3310

RATE: 3312 125 mL/hr

VTBI: 3314 250 mL 3316

TIME: 3316 2 hrs 00 min

FIG. 314

3300

3304

MEDICATION: DOPAMINE 3302

IN CONTAINER: 3304 400 mg / 250 mL 3306

CONCENTRATION: 3308 1.6 mg/mL 3308

WEIGHT: 3320 90 kg

DOSE RATE: 3318 5.0 mcg/kg/min 3318

RATE: 3312 16.9 mL/hr

VTBI: 3314 250 mL 3316

TIME: 3316 14 hrs 48 min

FIG. 315

3300

3304

MEDICATION: FLUOROURACIL 3302

IN CONTAINER: 3304 DRUG AMOUNT 1700 mg / TOTAL VOLUME 500 mL 3306

CONCENTRATION: 3308 3.4 mg/mL 3308

BSA: 3322 1.7 m²

DOSE RATE: 3318 1000 mg/m²/day 3318

RATE: 3312 20.8 mL/hr

VTBI: 3314 500 mL 3316

TIME: 3316 24 hrs 00 min

FIG. 316

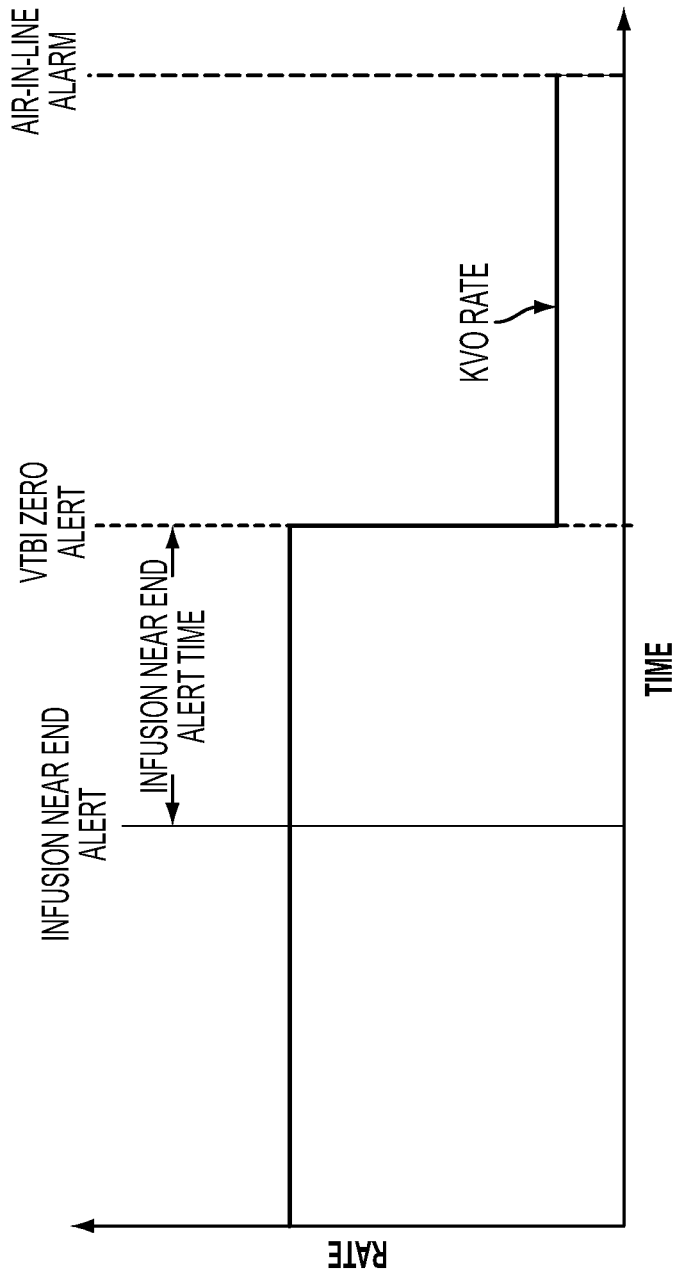


FIG. 317

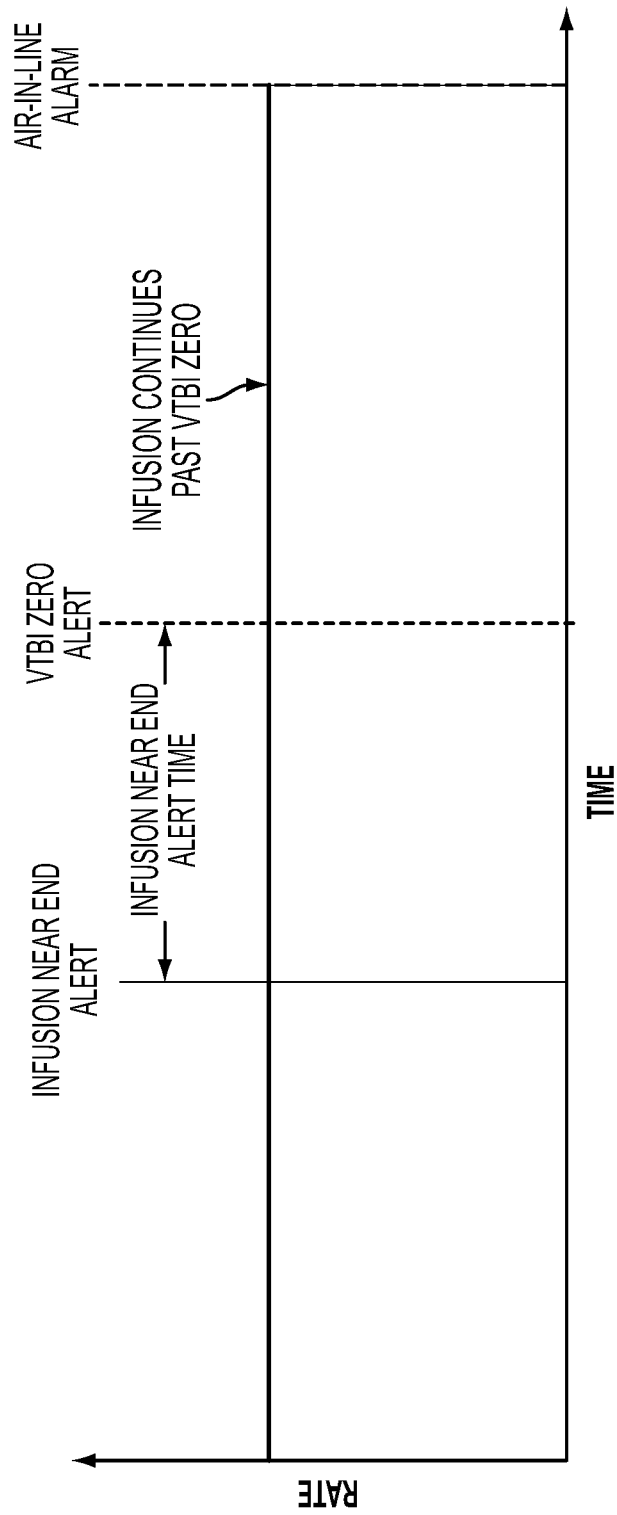


FIG. 318

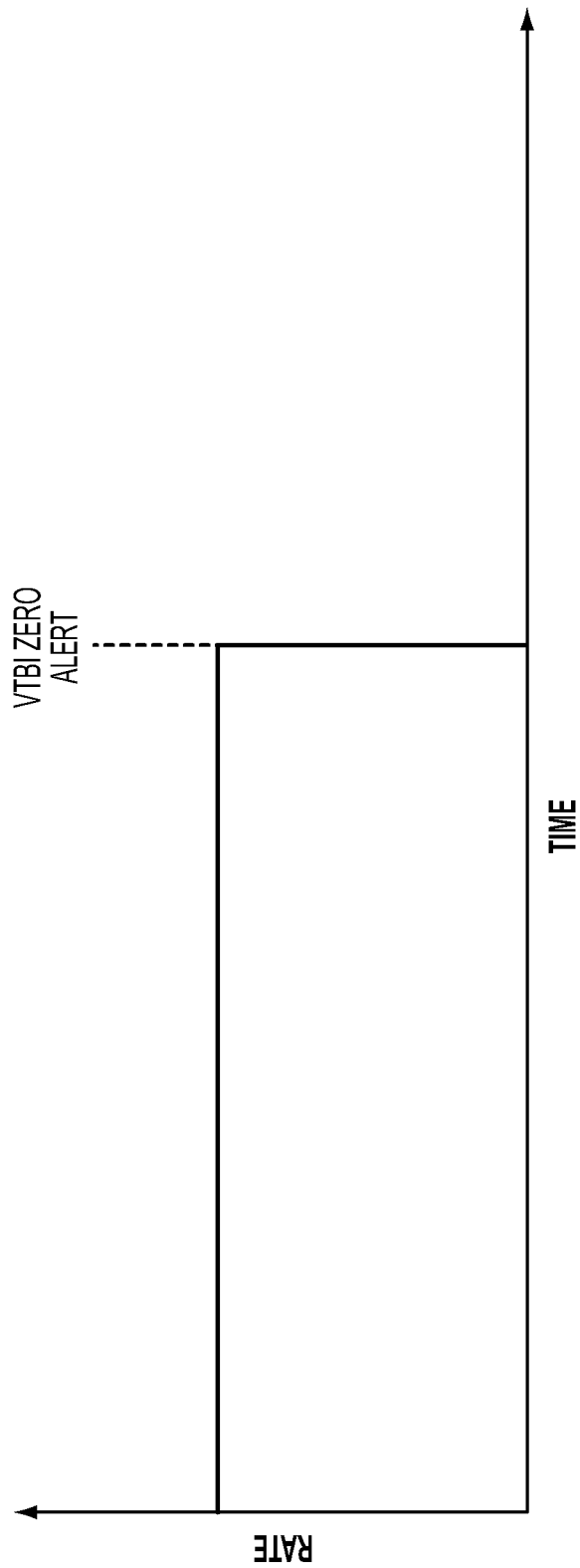


FIG. 319

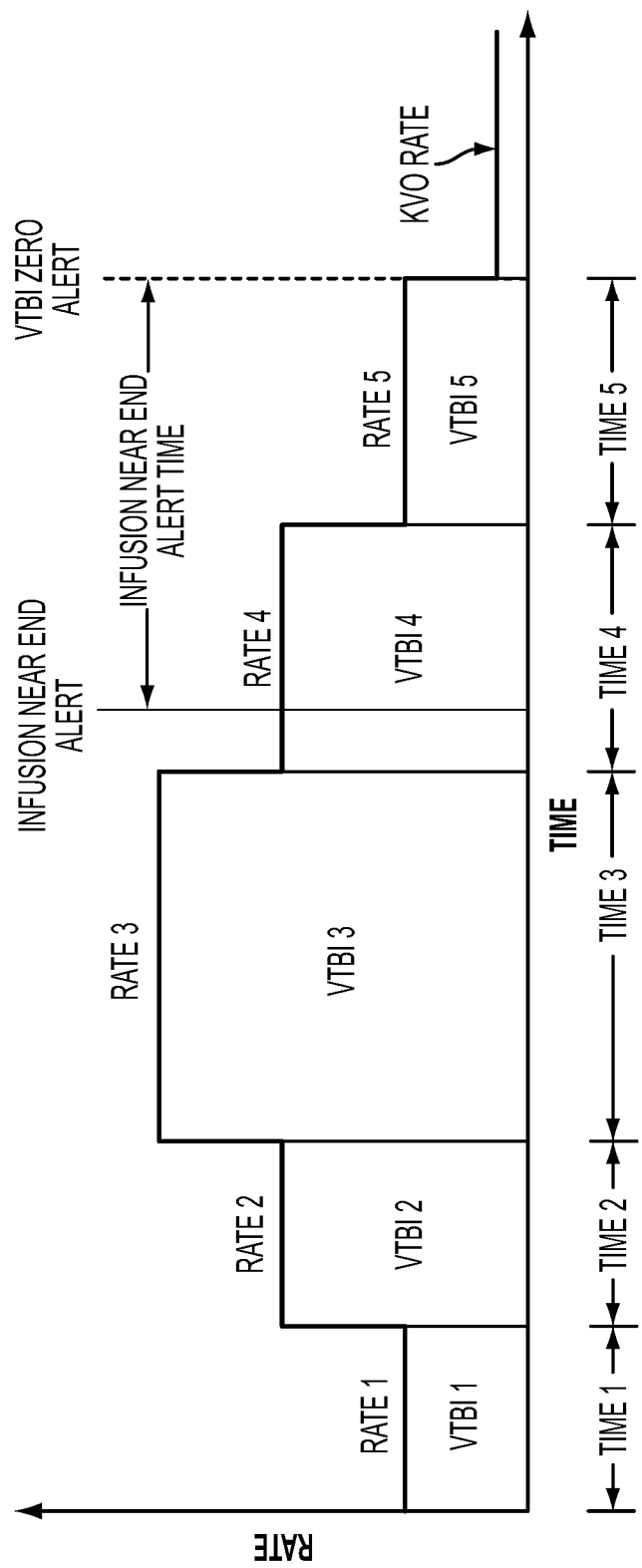


FIG. 321

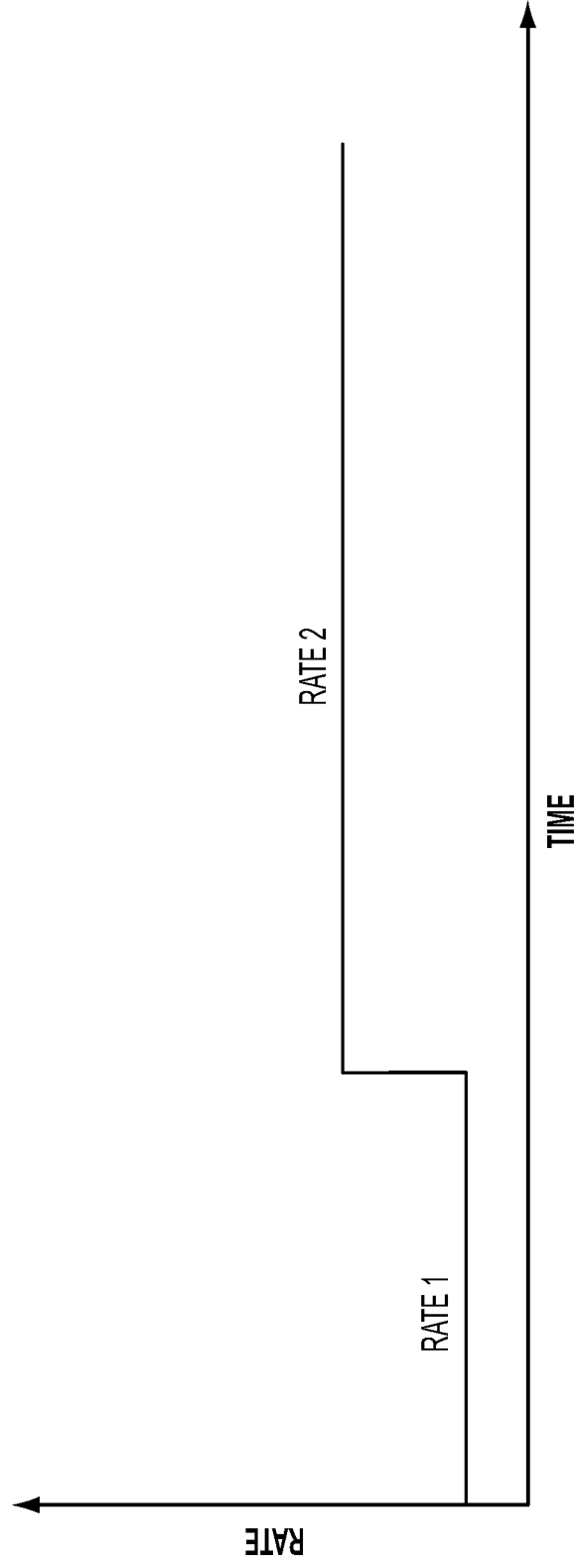


FIG. 320

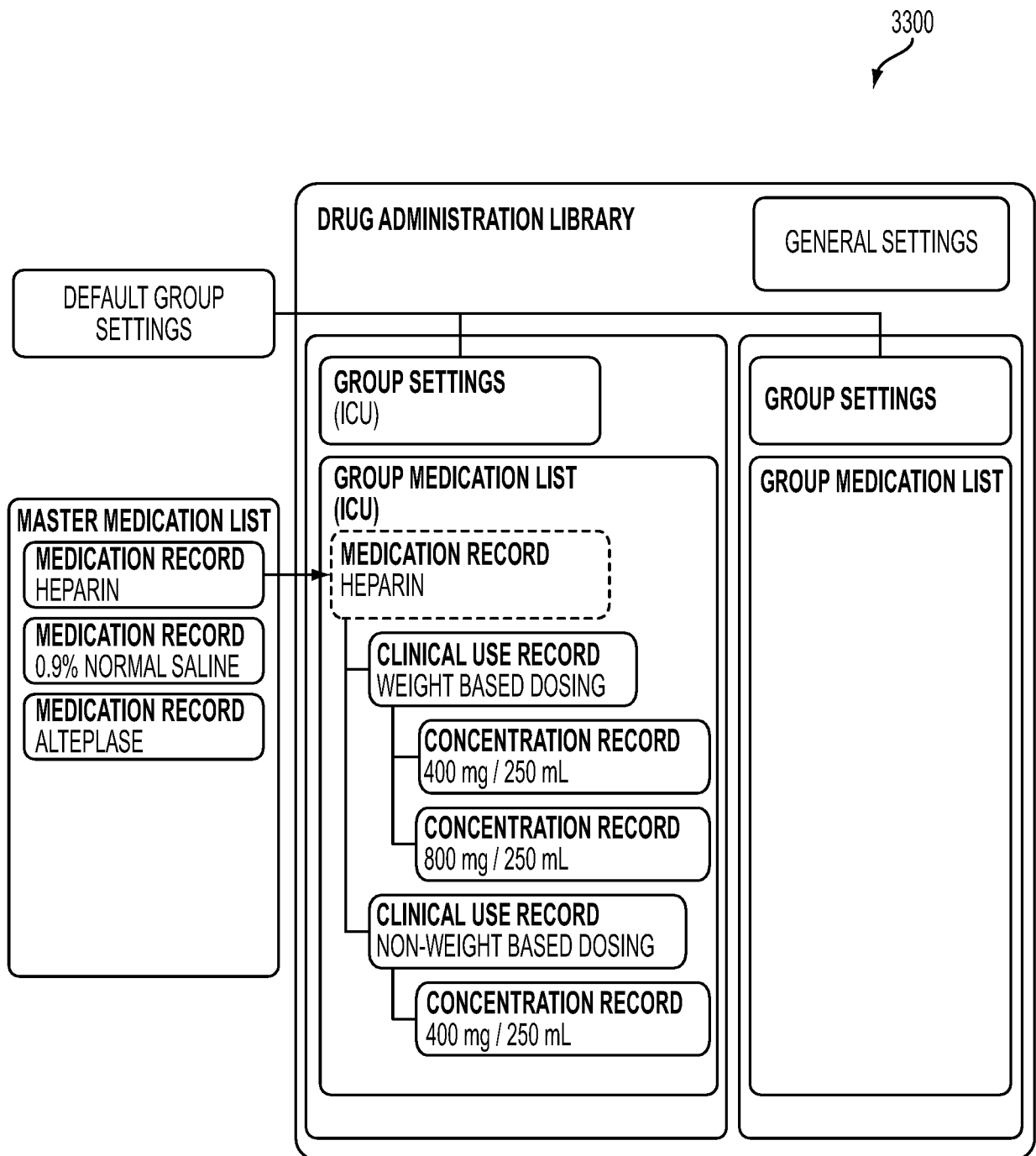


FIG. 322

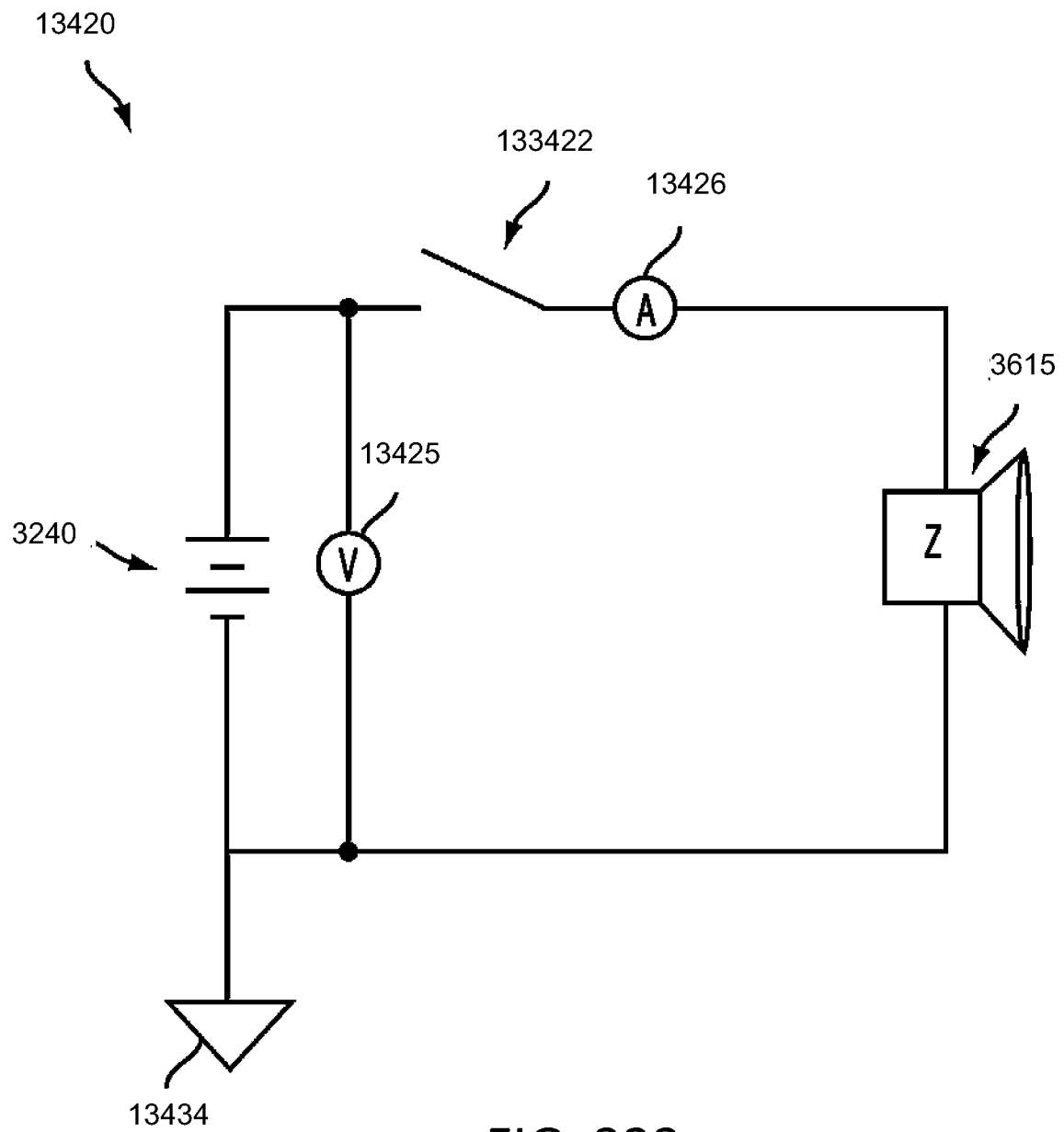


FIG. 323

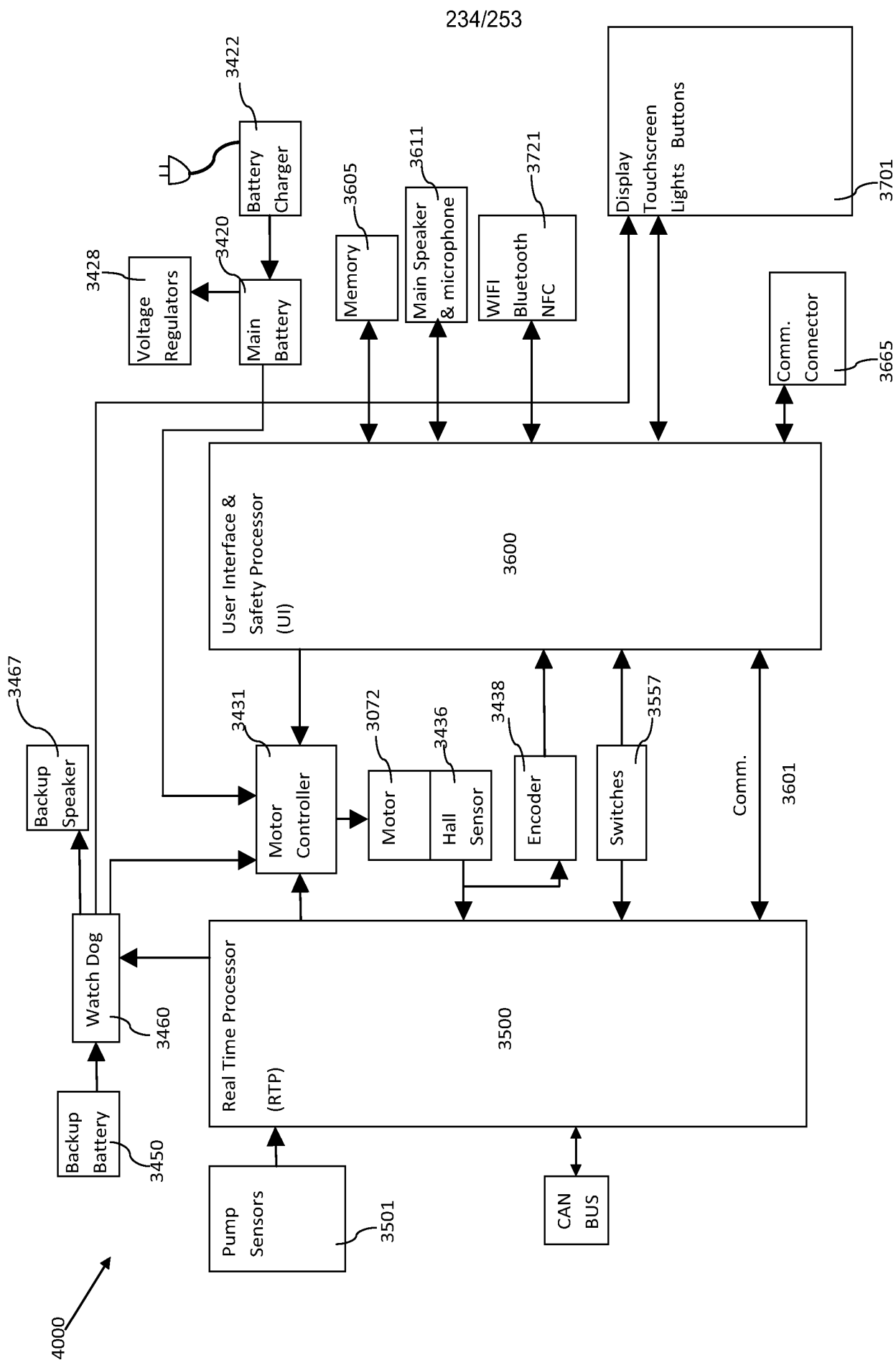


FIG. 324

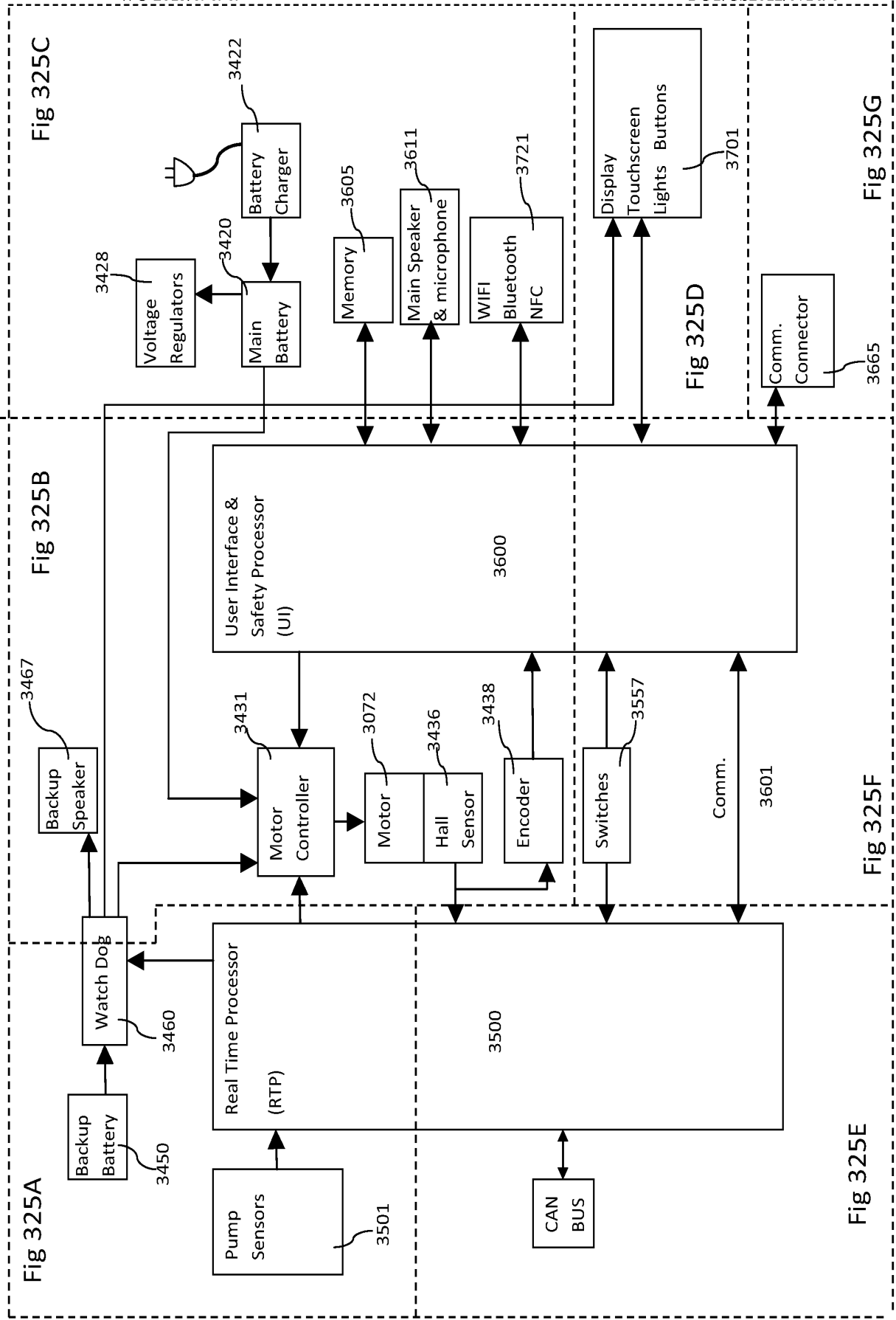


Fig 325

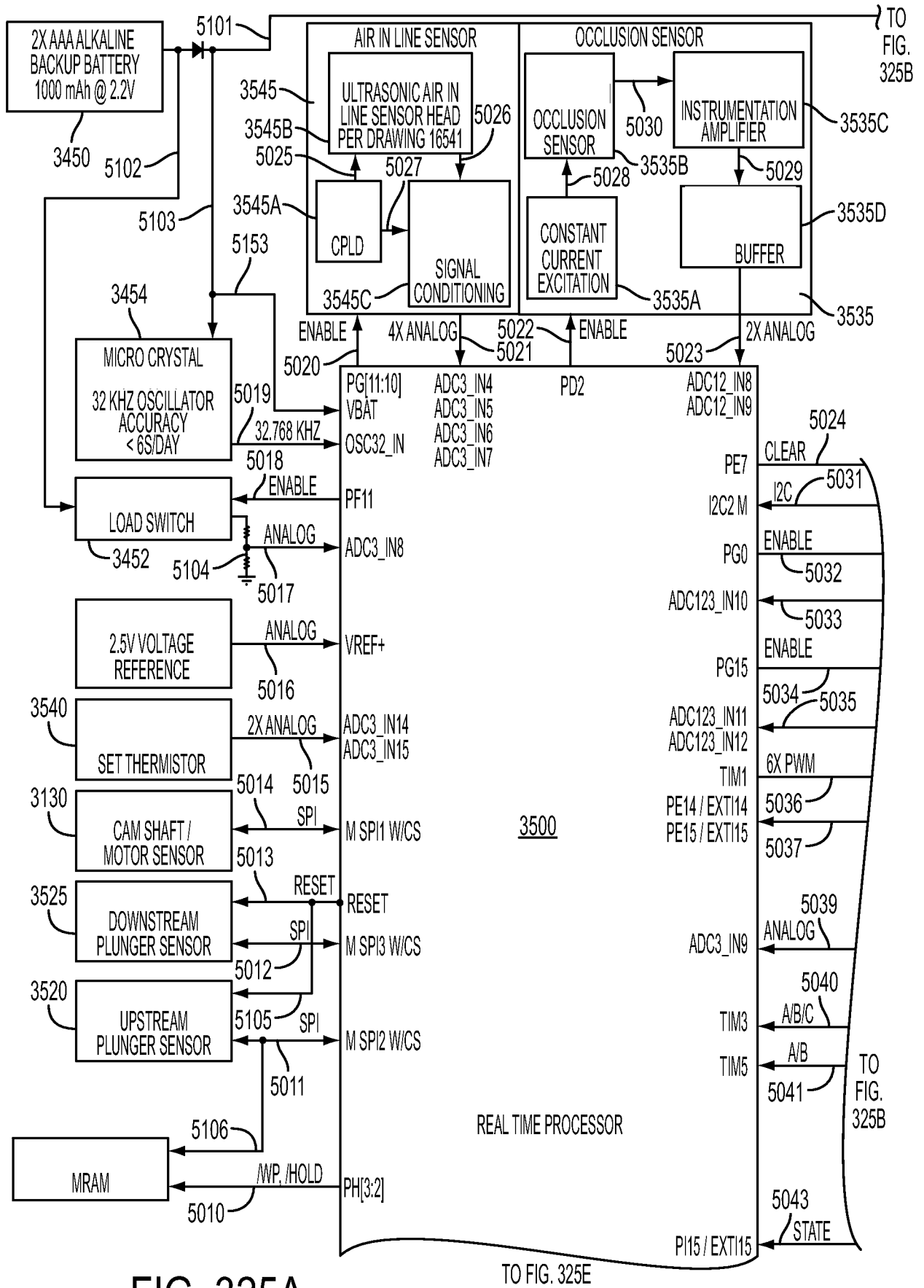
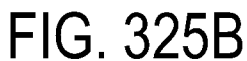
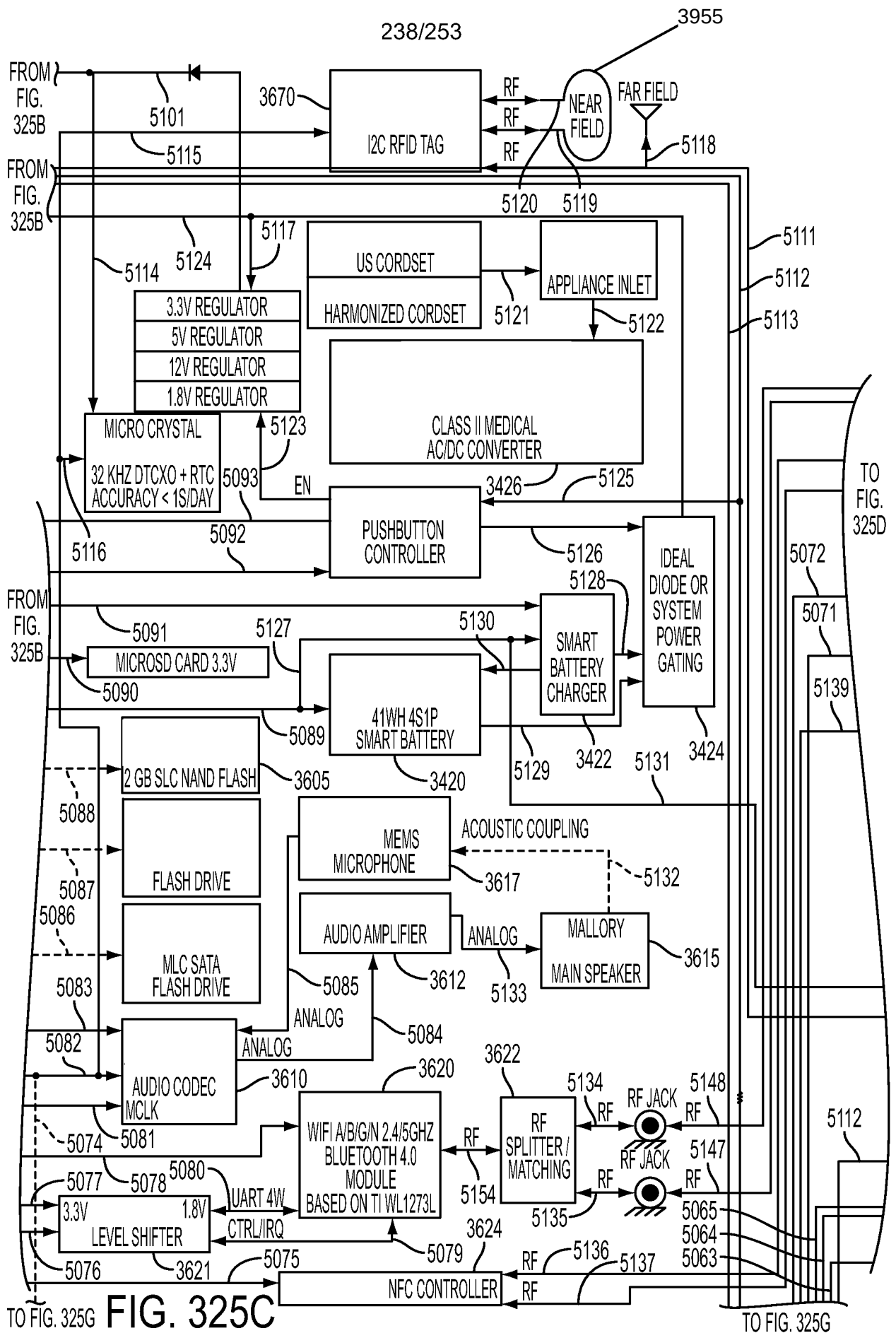
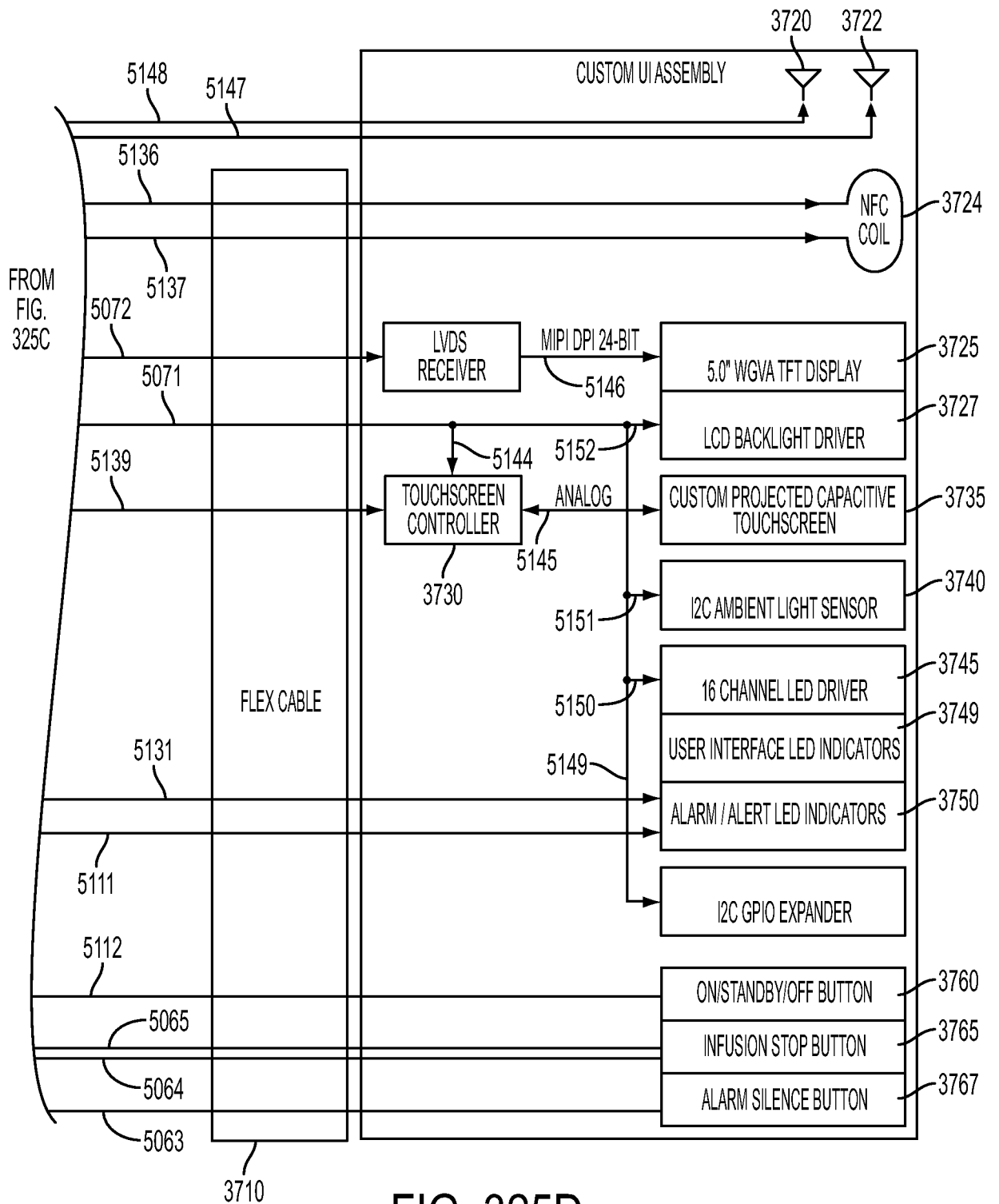


FIG. 325A



TO FIG. 325F





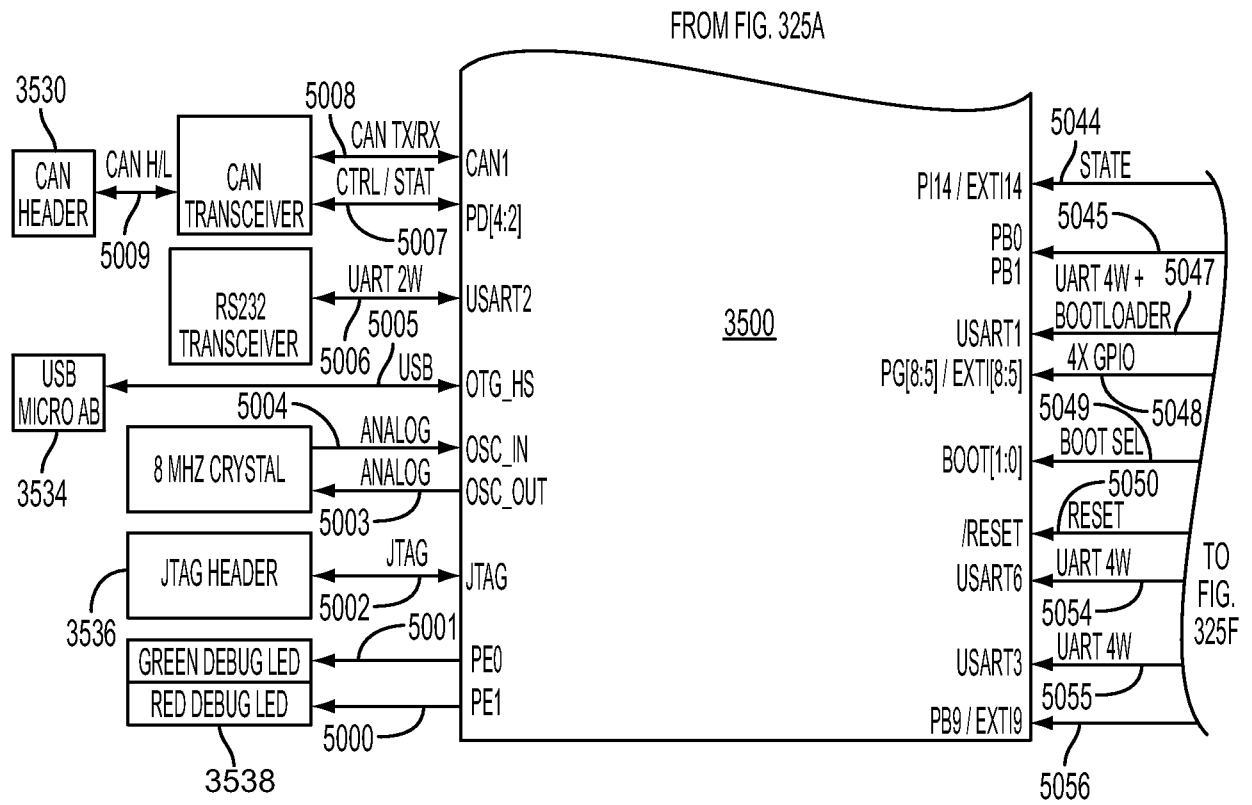


FIG. 325E

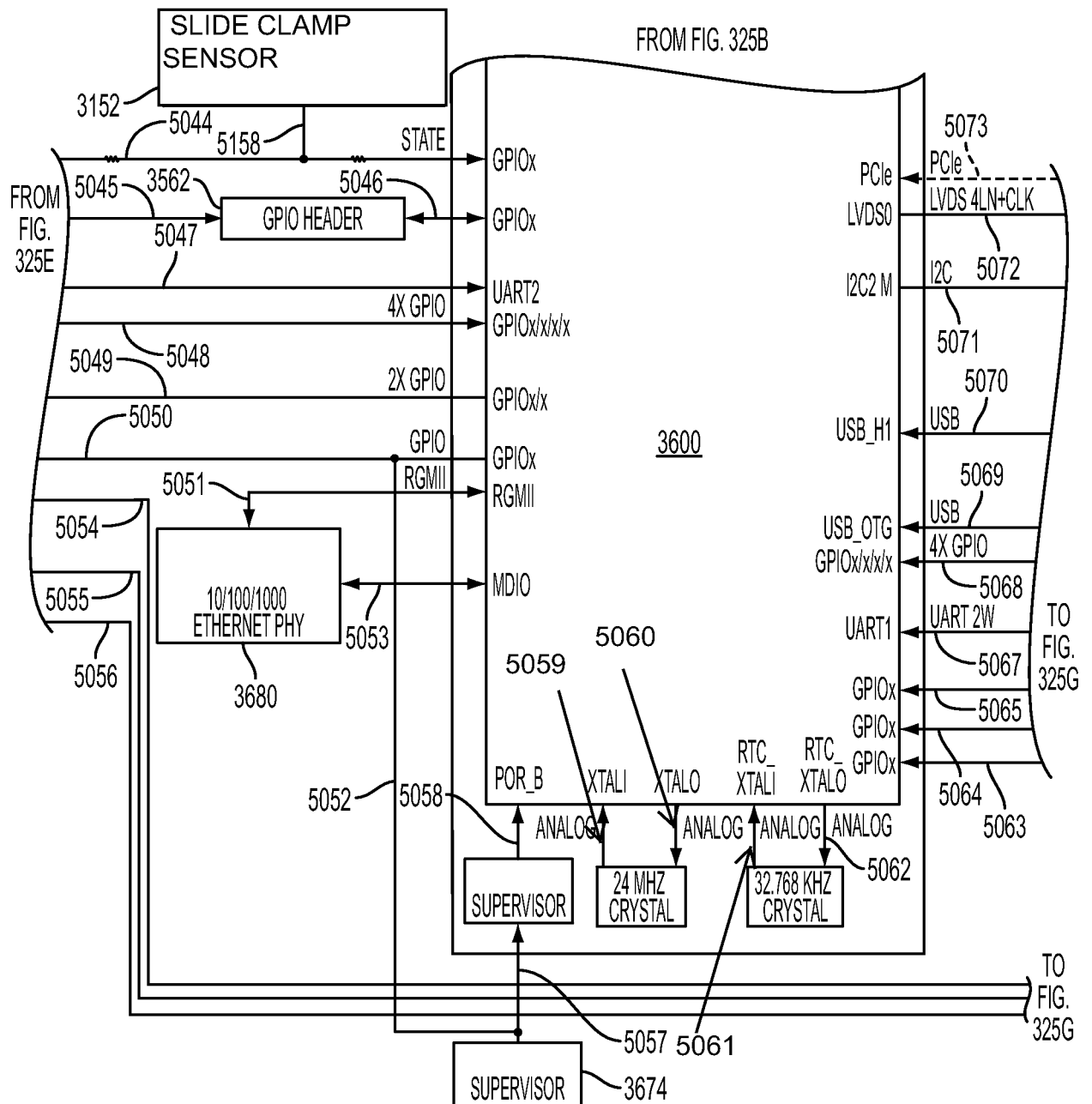


FIG. 325F

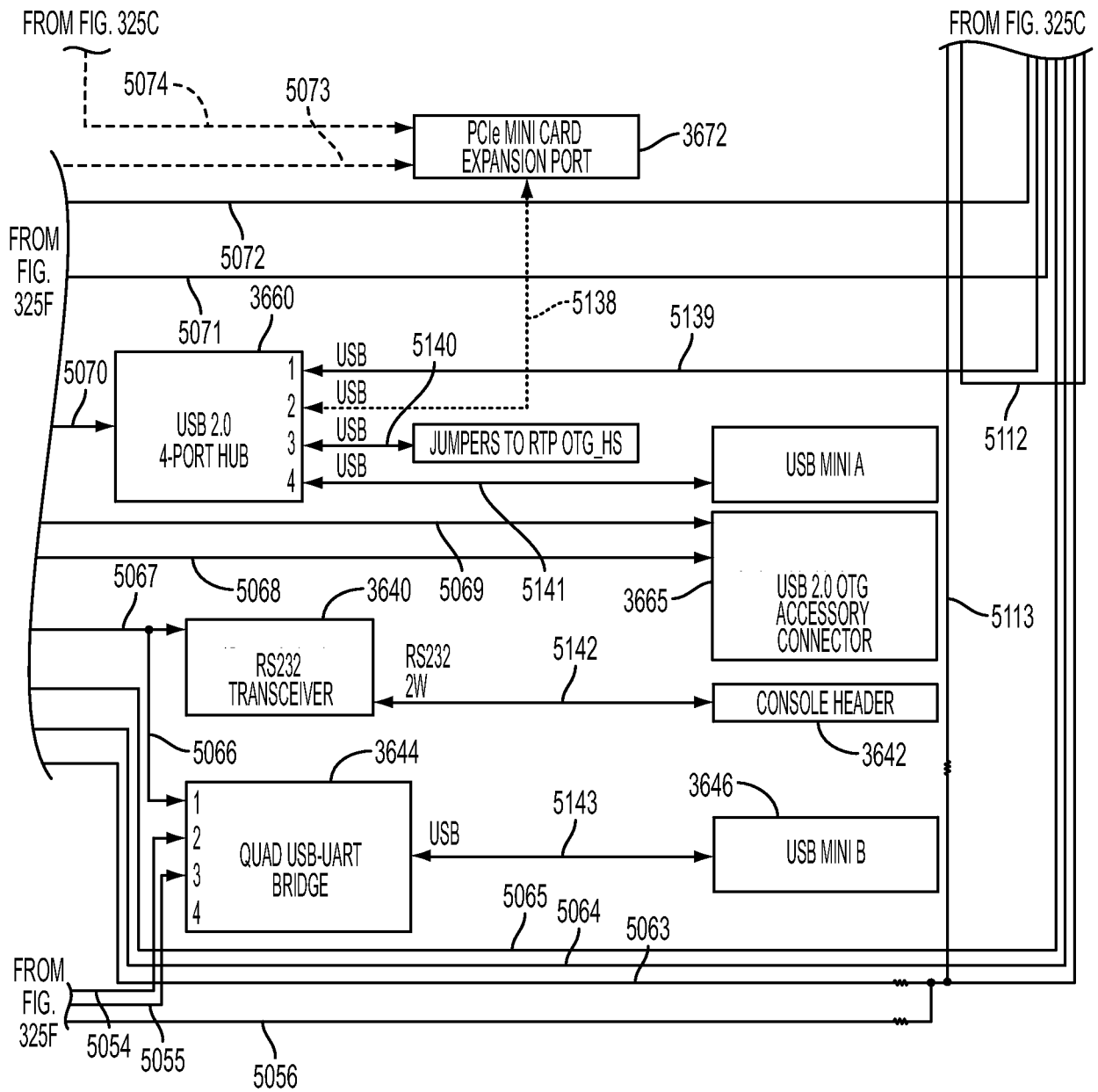


FIG. 325G

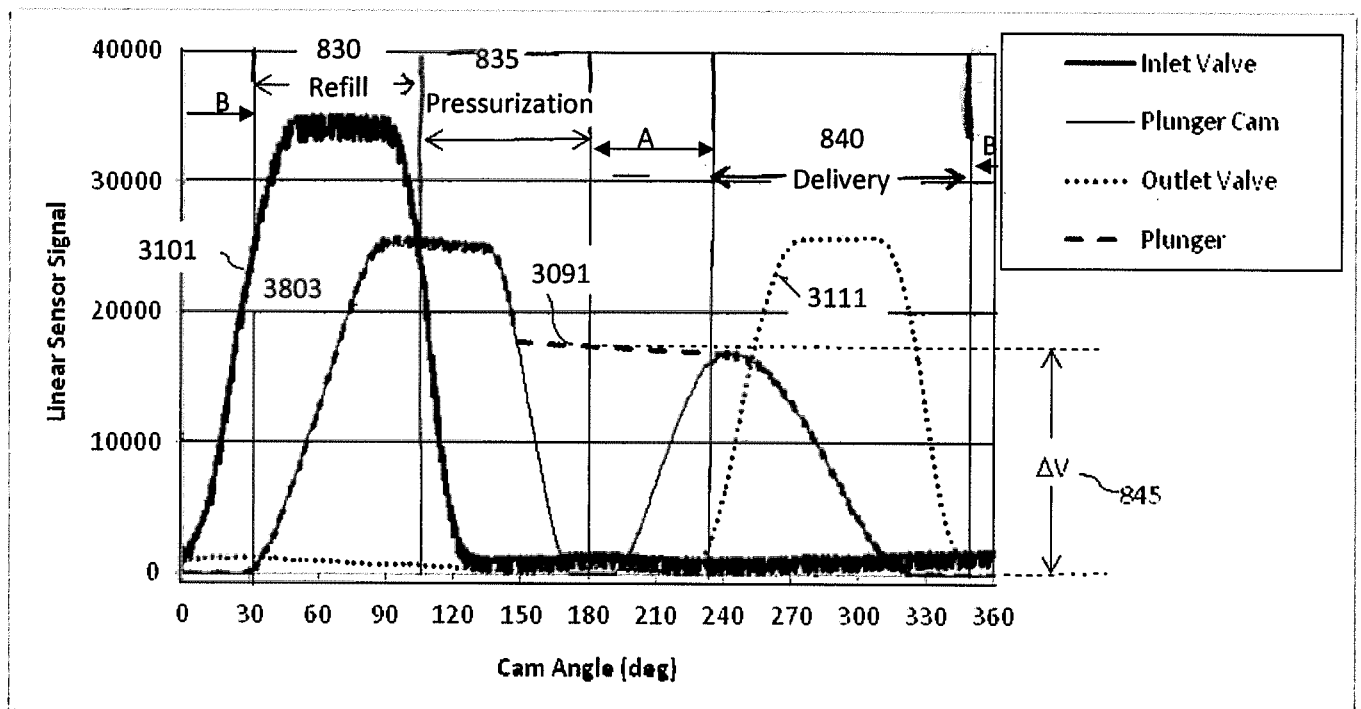


FIG. 326

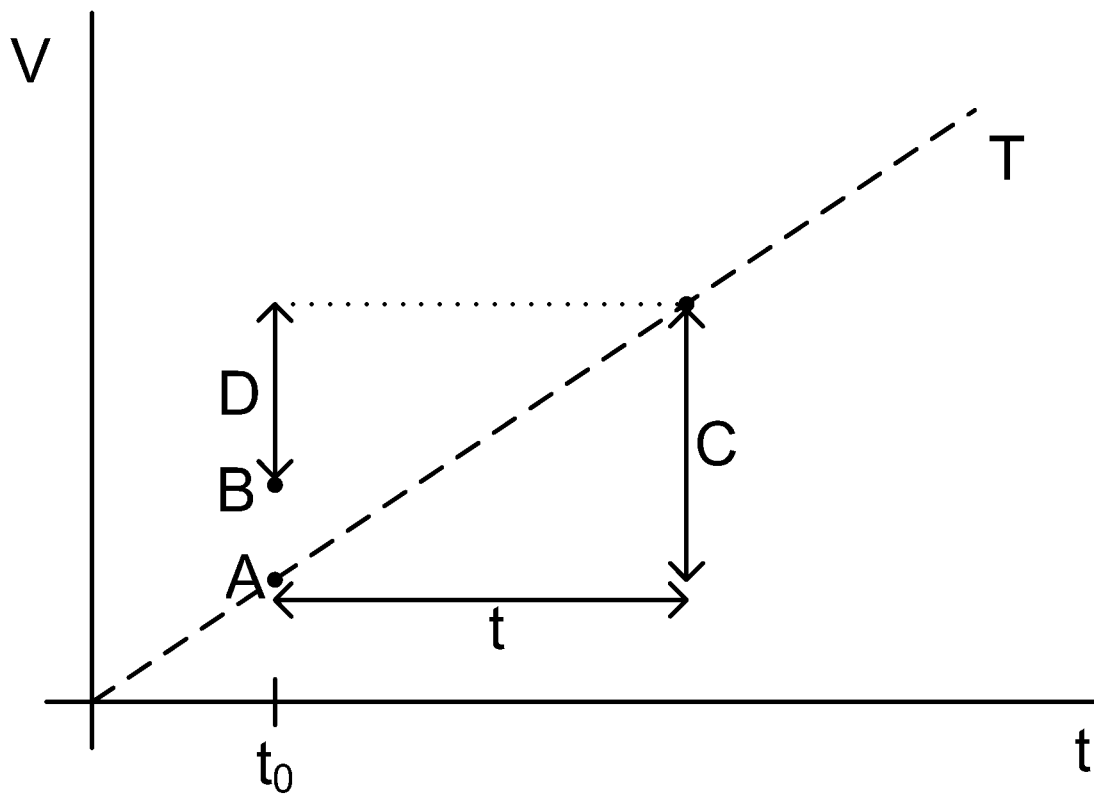


FIG. 327

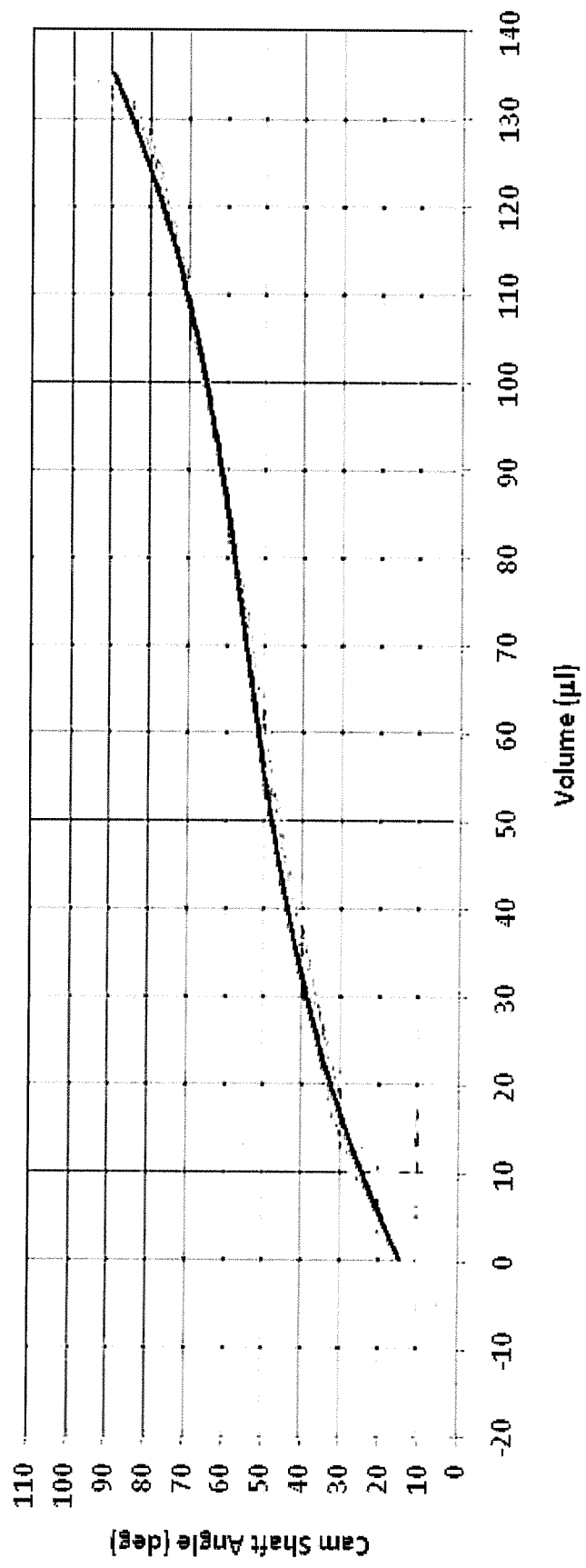


FIG. 328

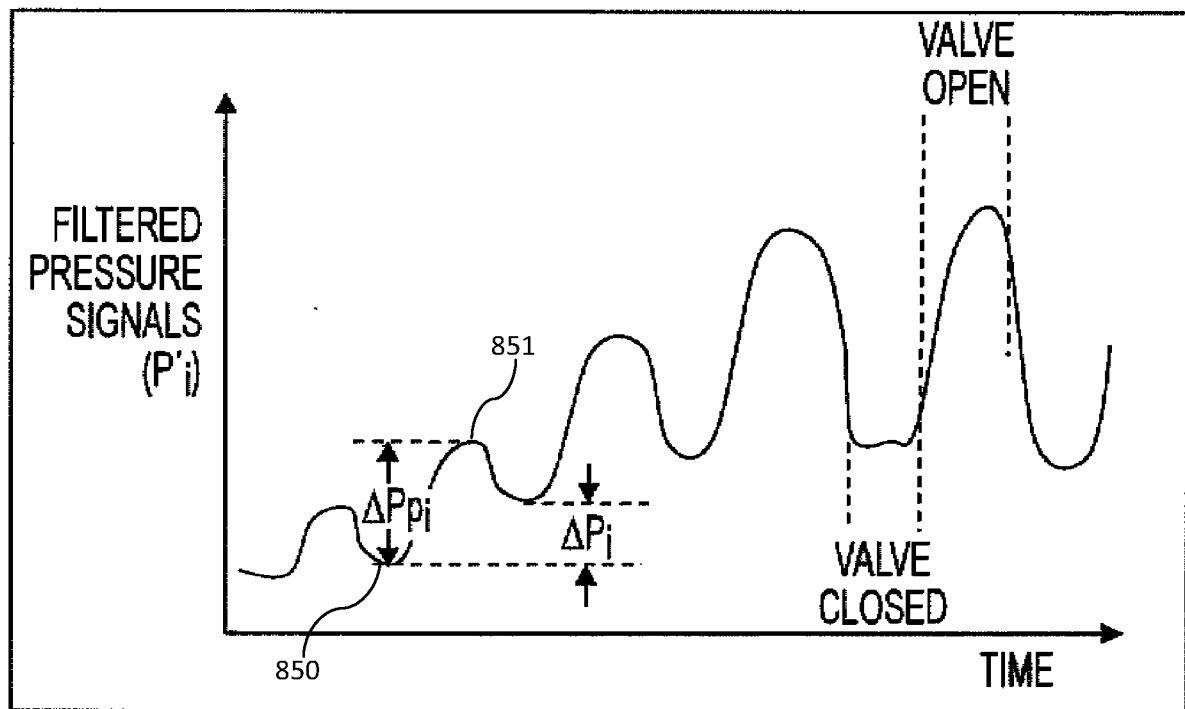


FIG. 329

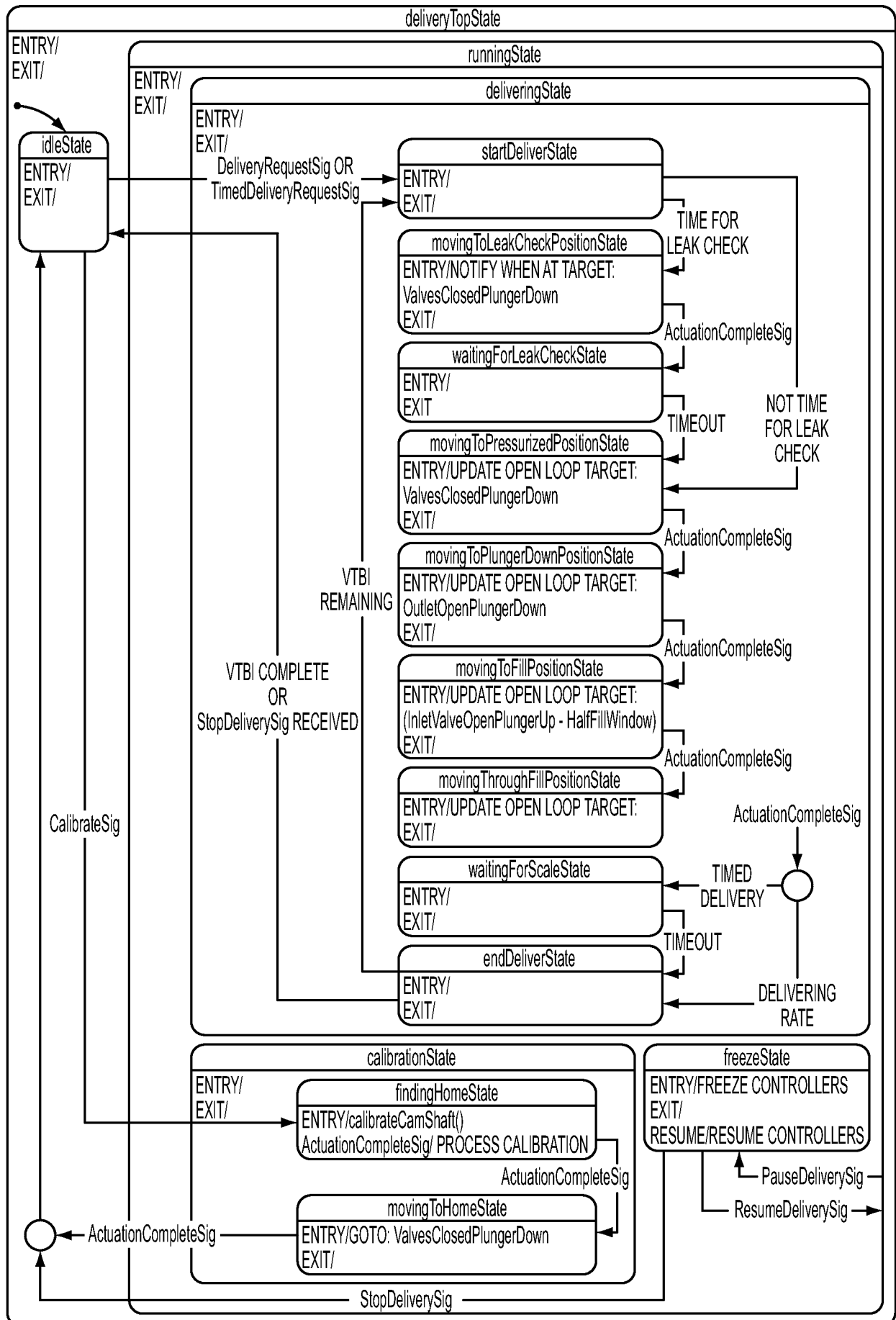


Fig. 330

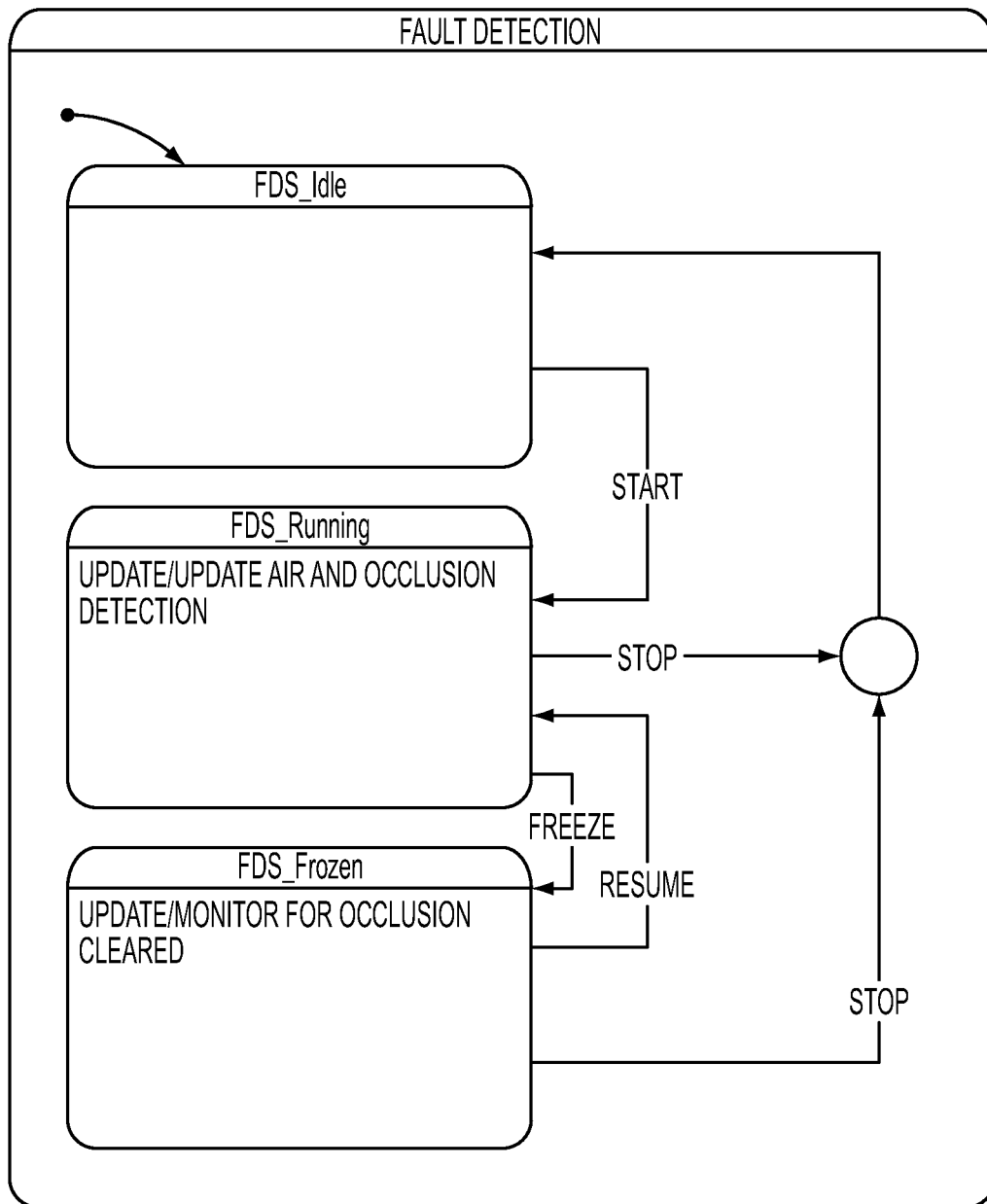


Fig. 331

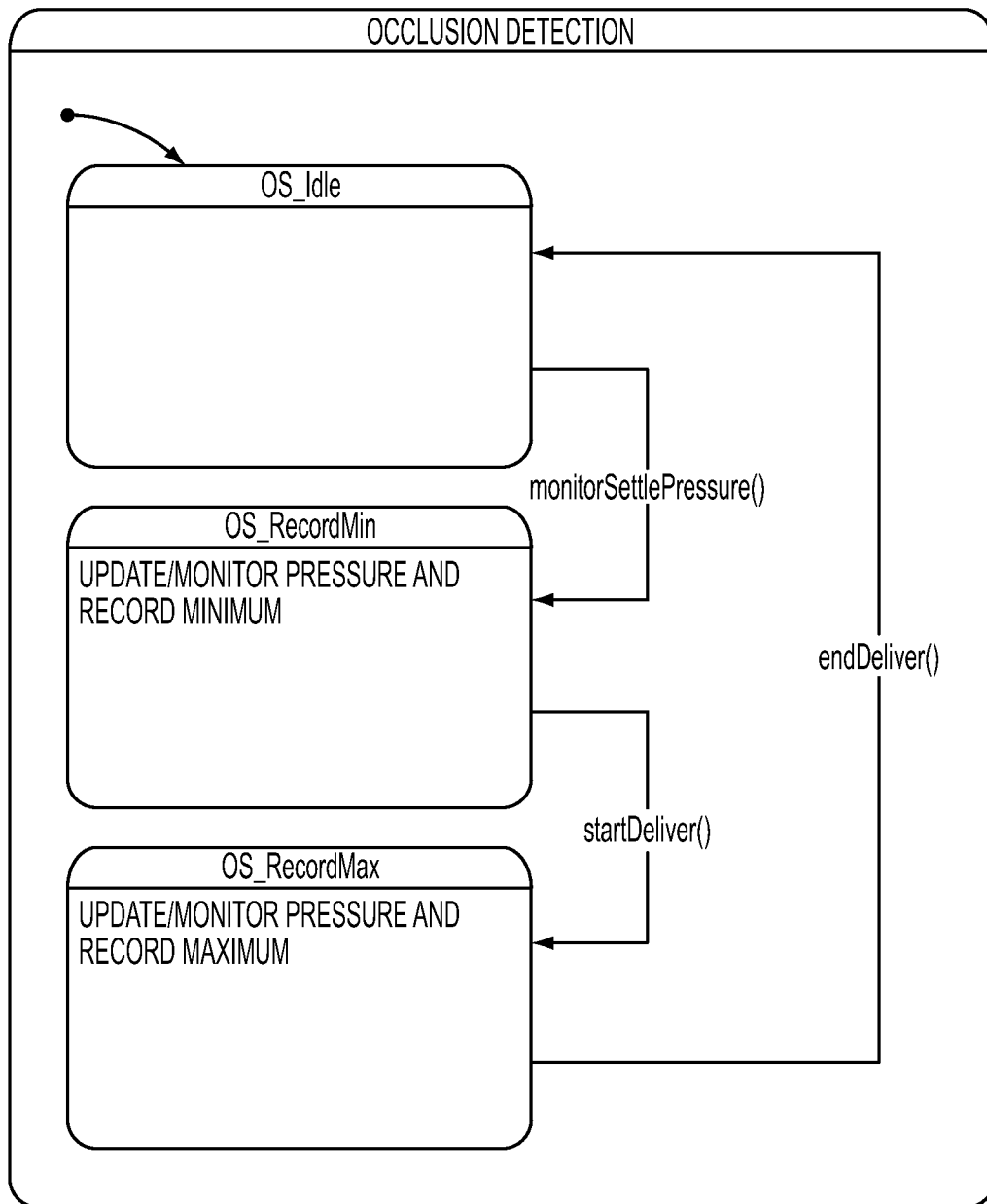


Fig. 332

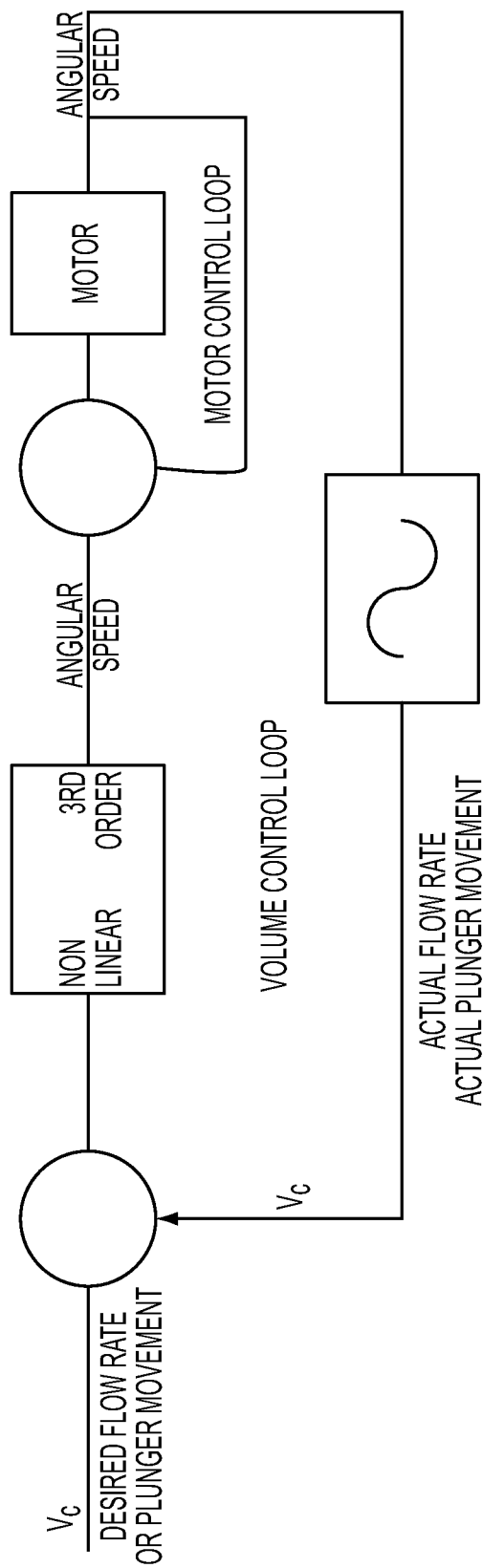


Fig. 333

S



Fig. 334

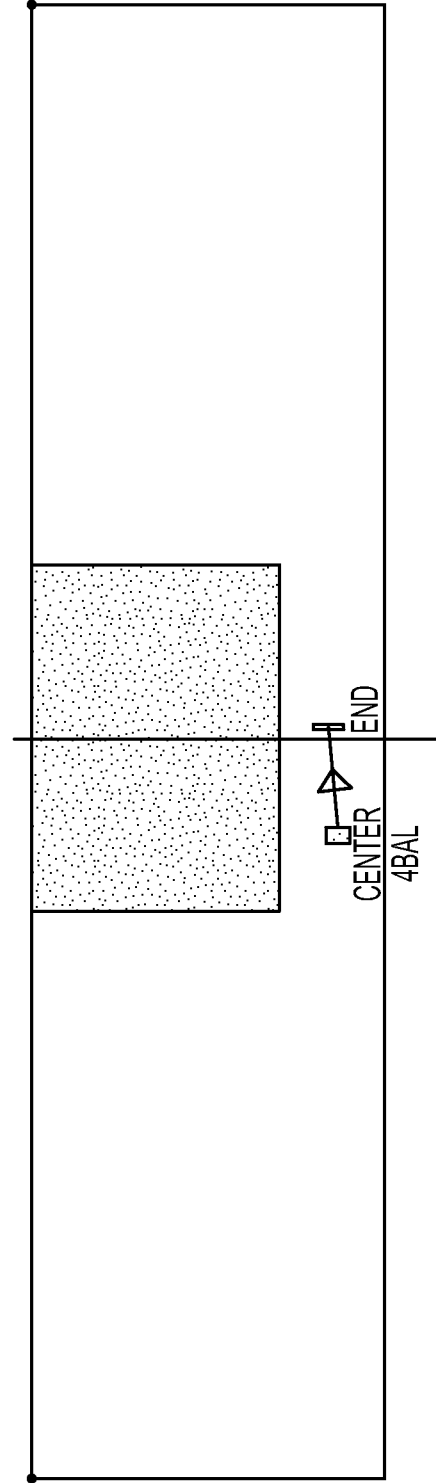
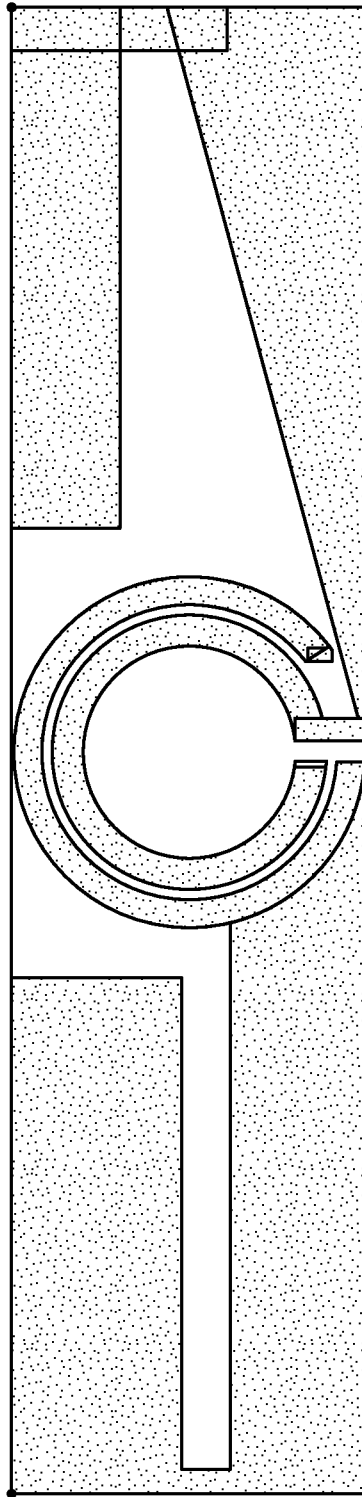


Fig. 335



Fig. 336