

FIG. 1



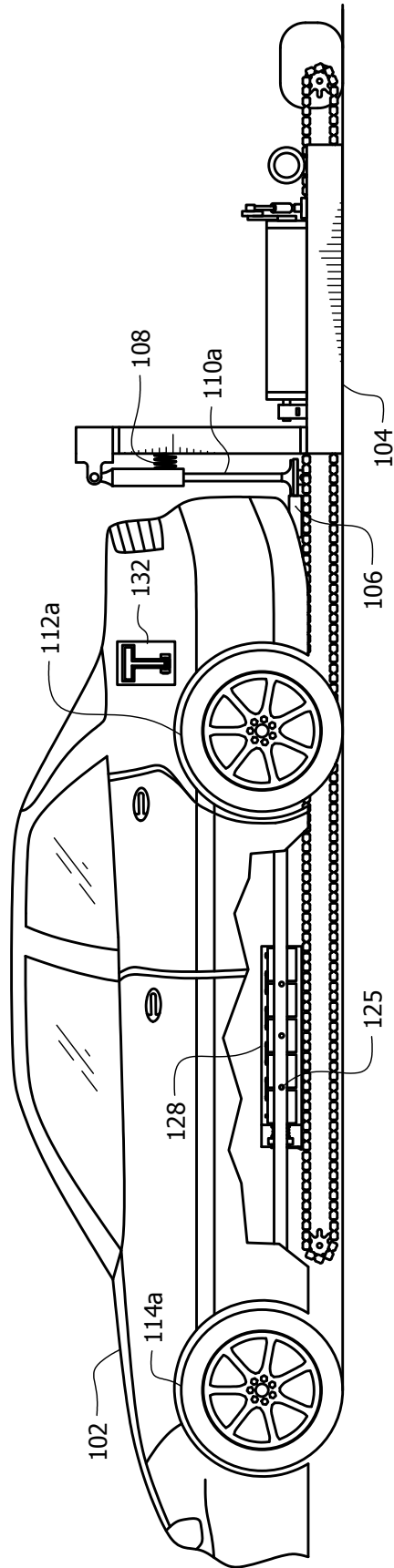
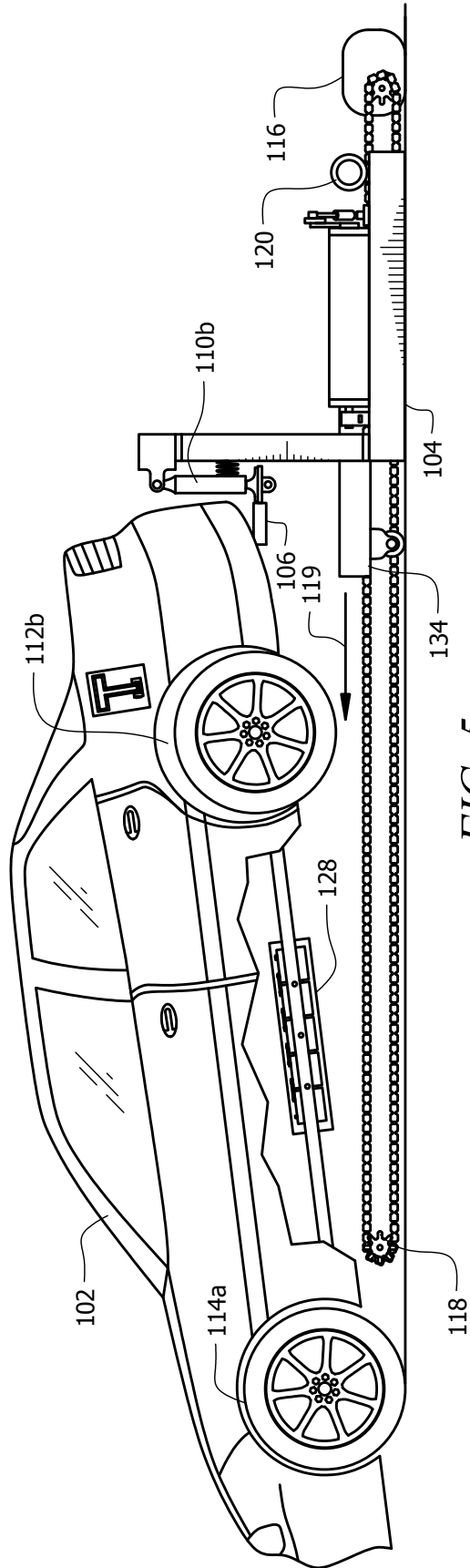
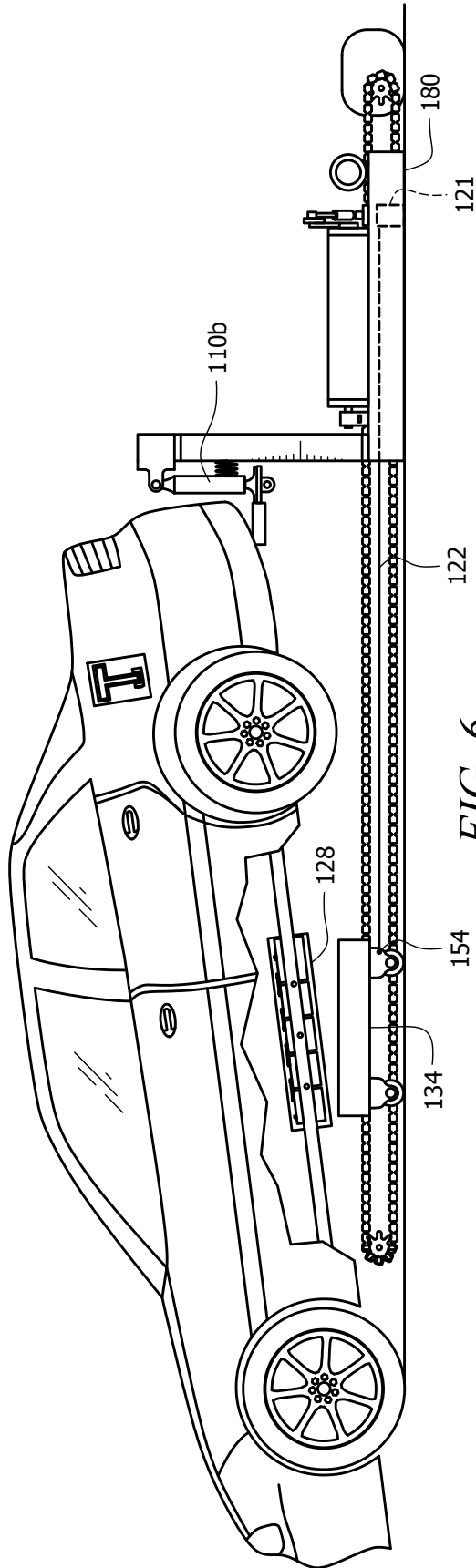


FIG. 4



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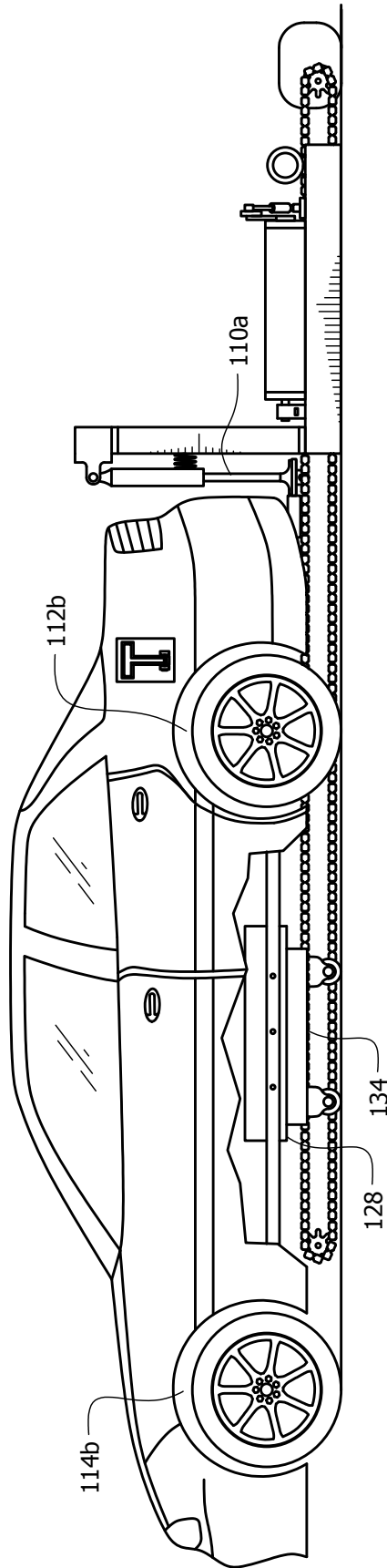
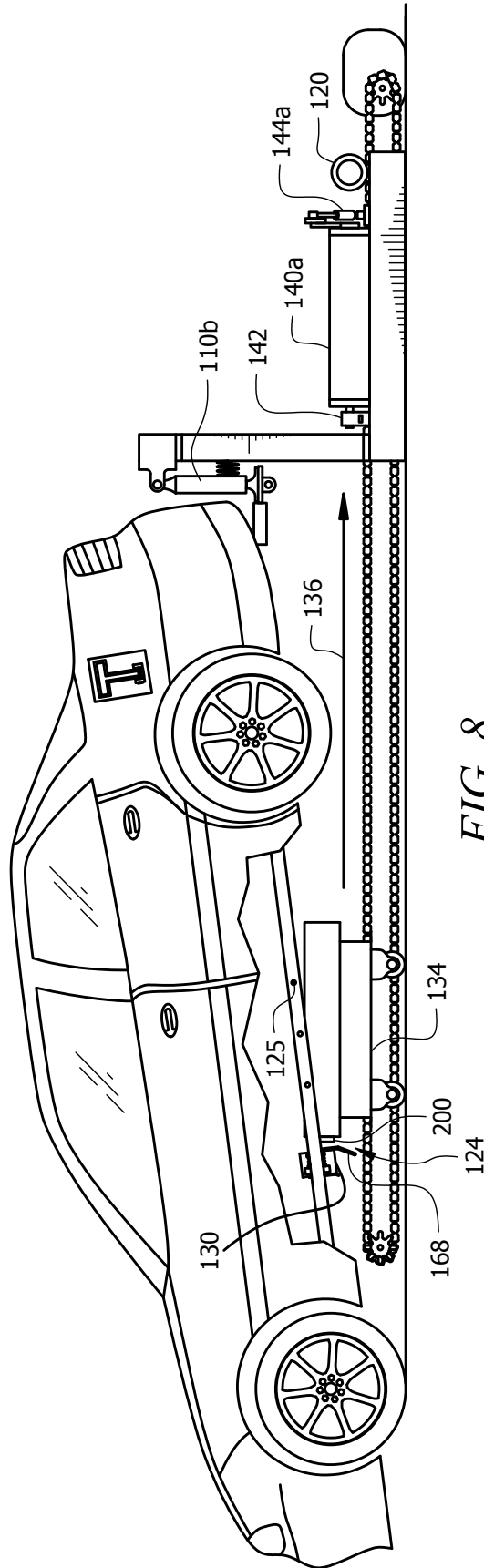


FIG. 7

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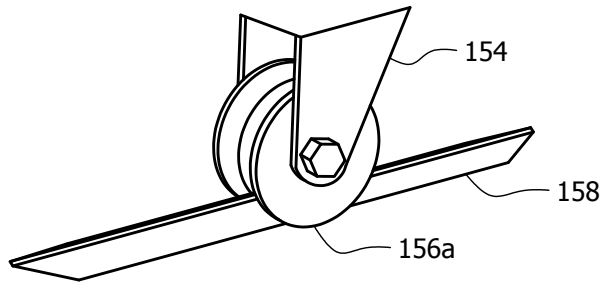


FIG. 10

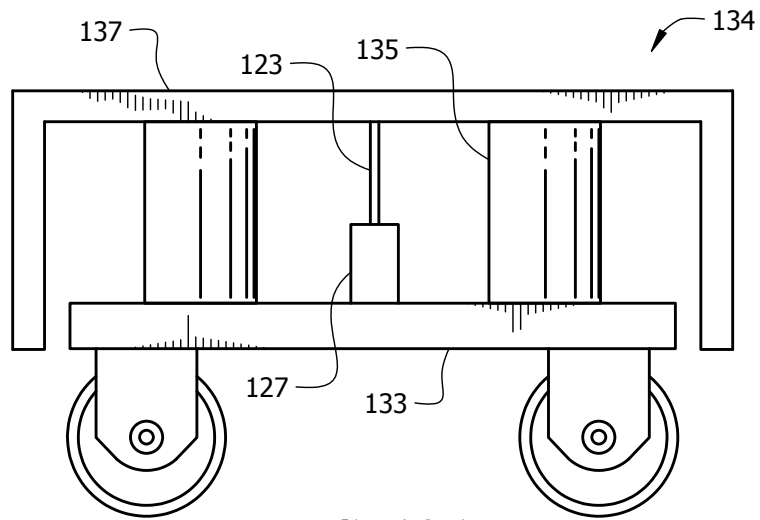


FIG. 10A

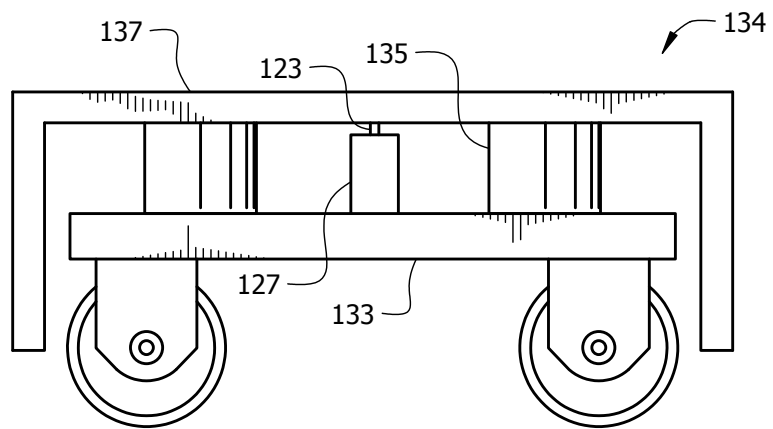


FIG. 10B

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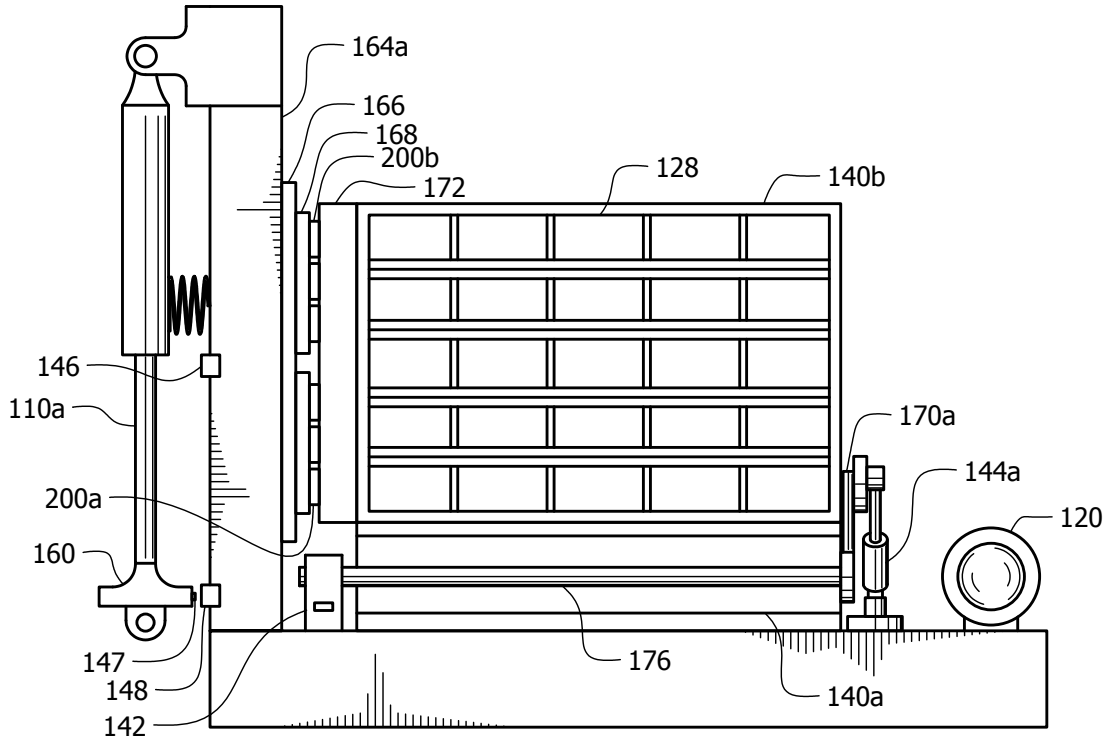


FIG. 11

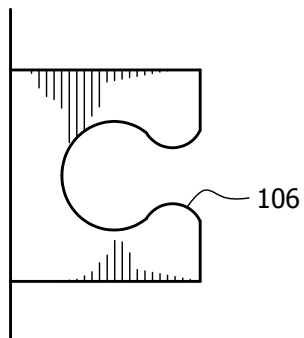
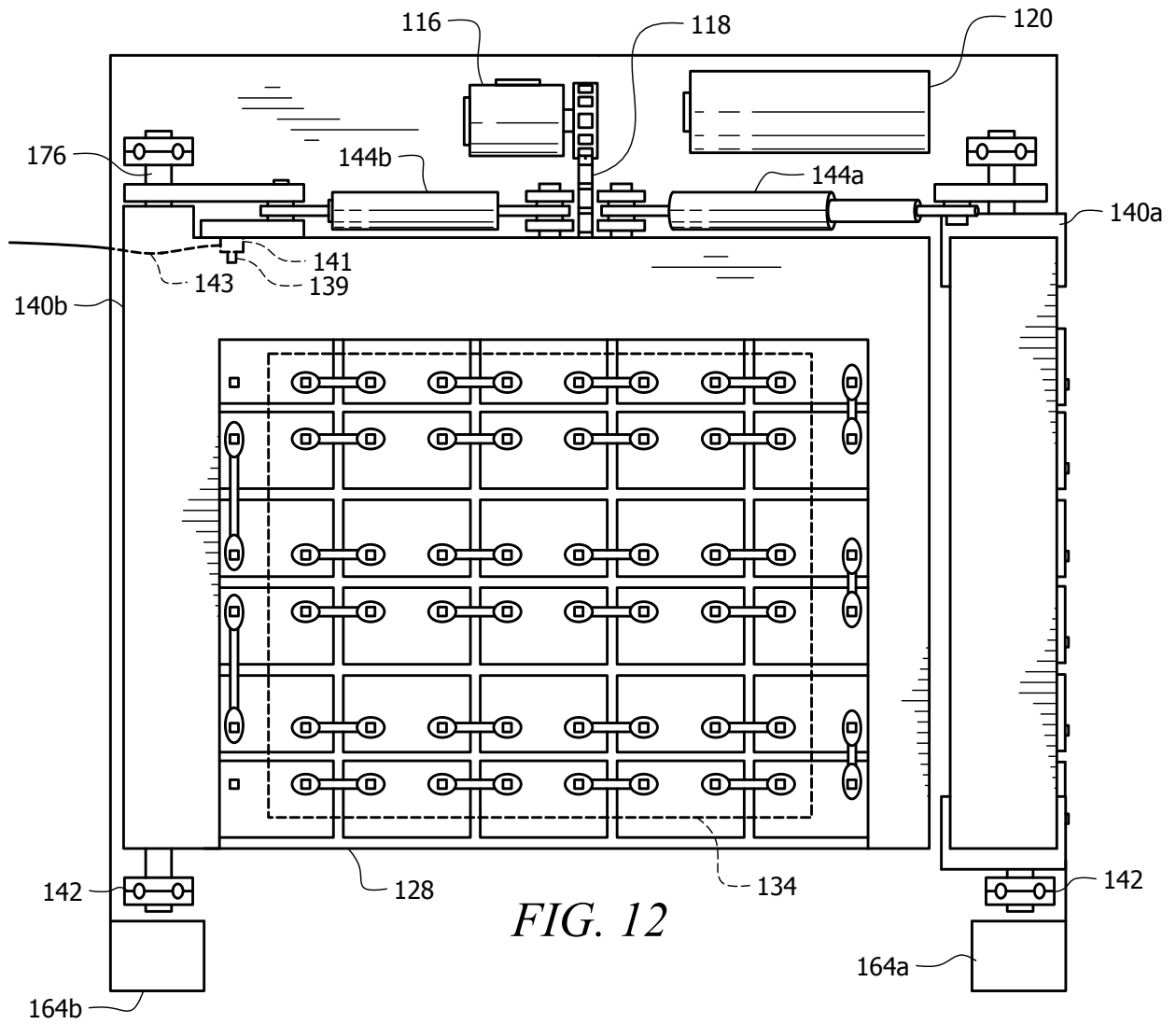


FIG. 11A

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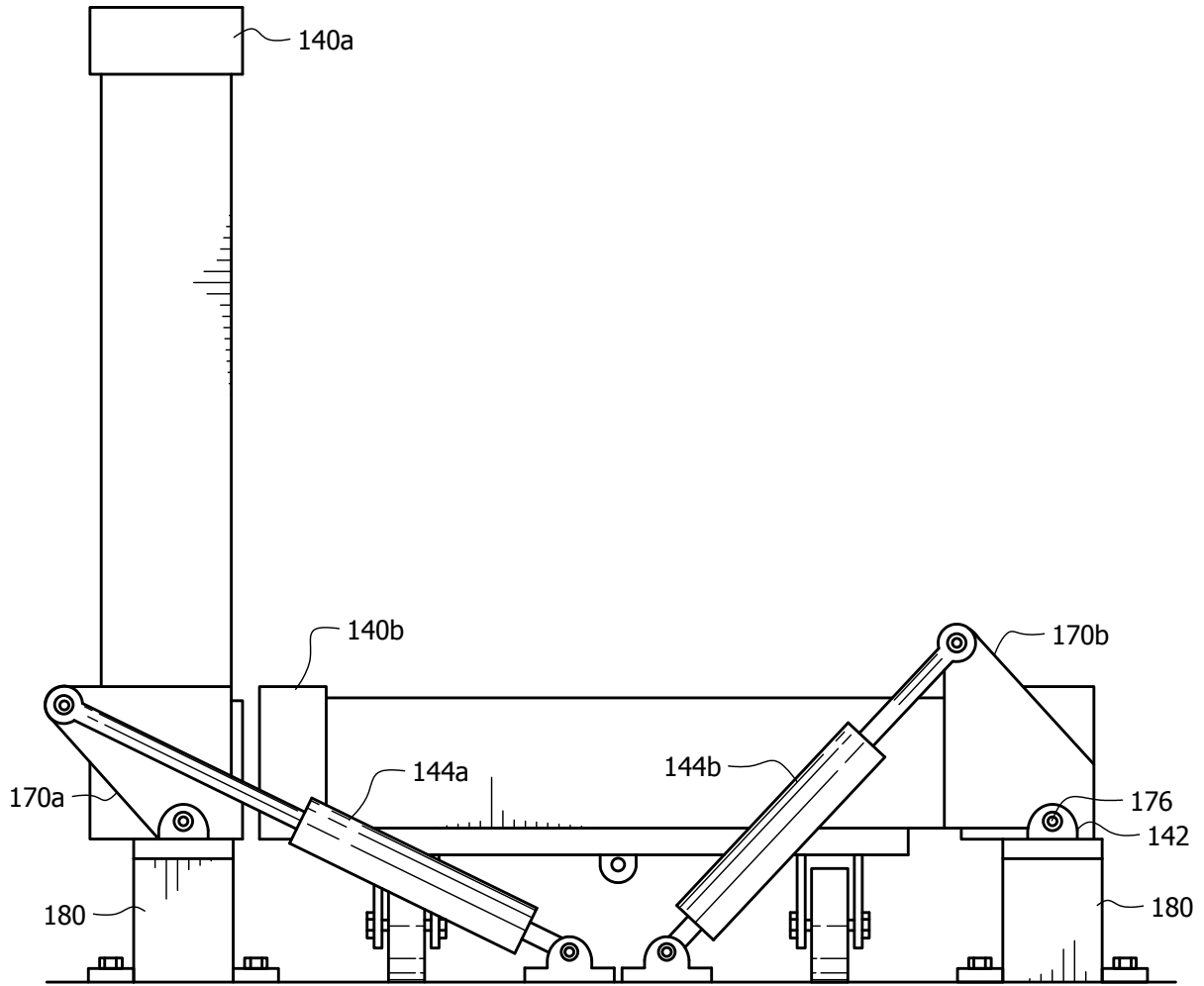


FIG. 13

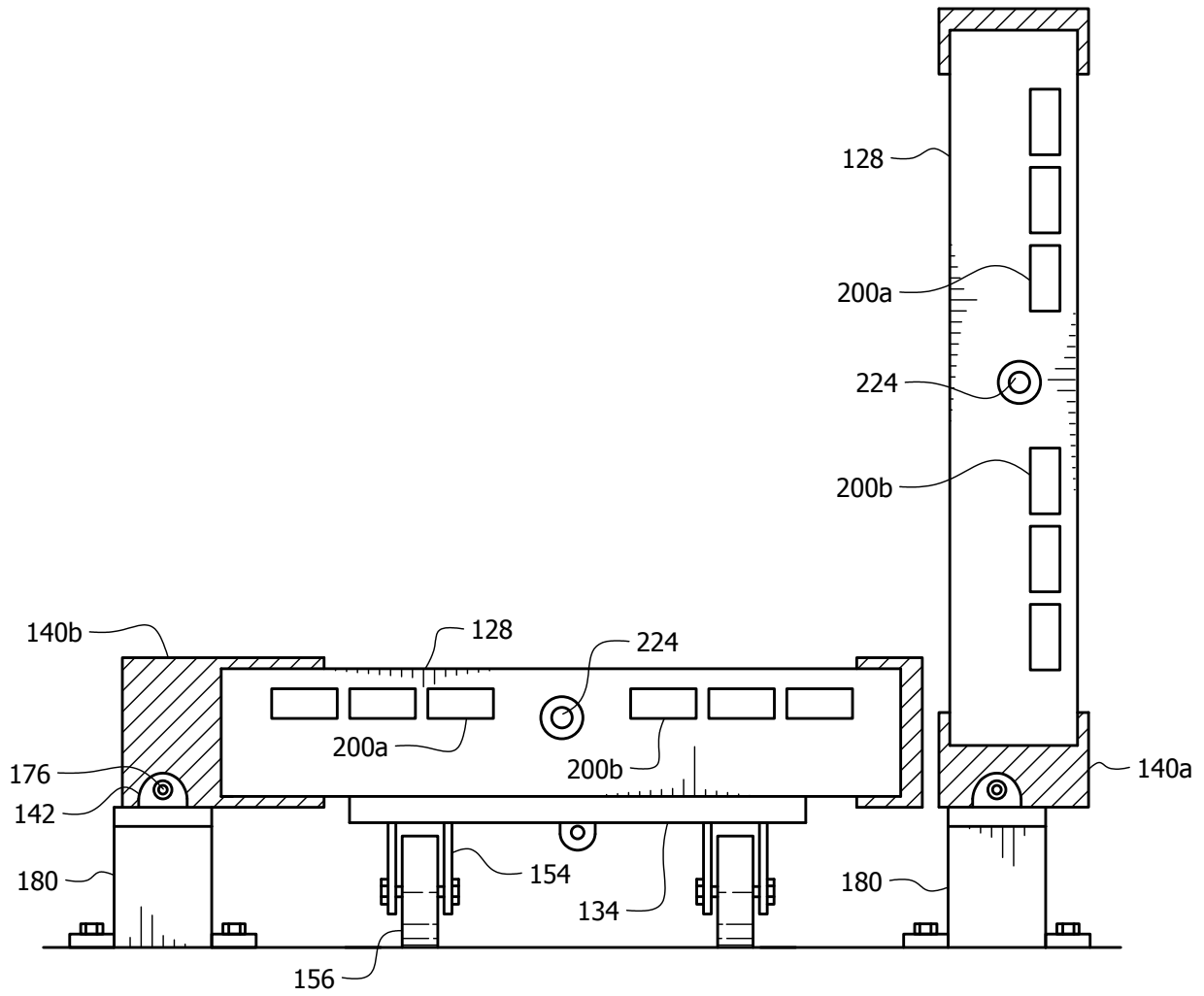


FIG. 14

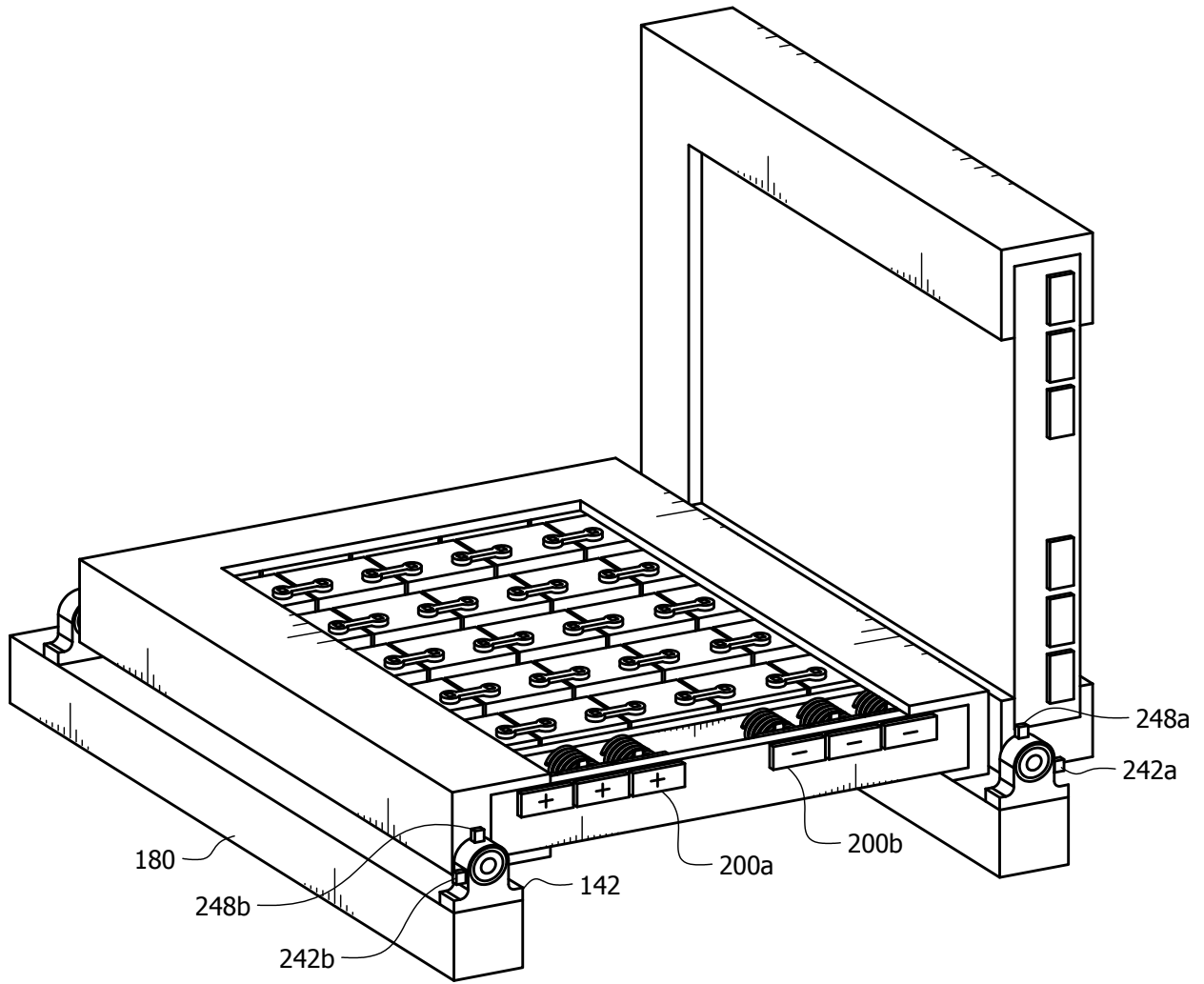


FIG. 14A

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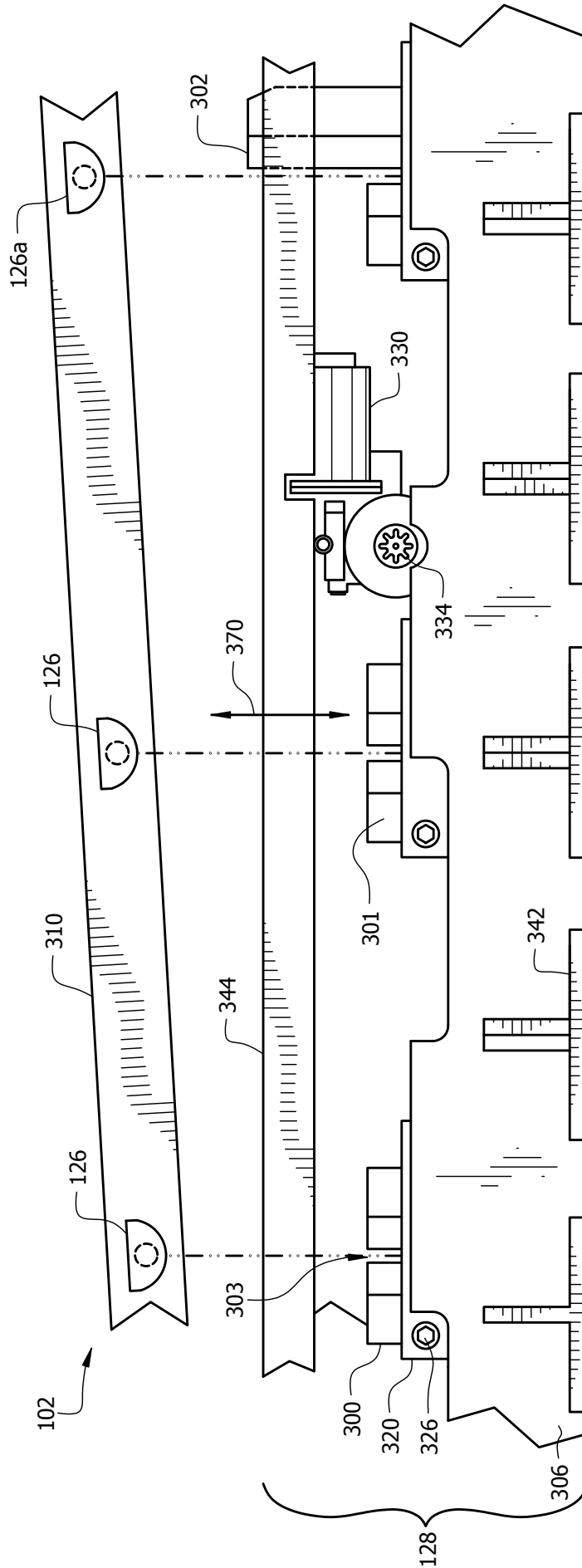


FIG. 15





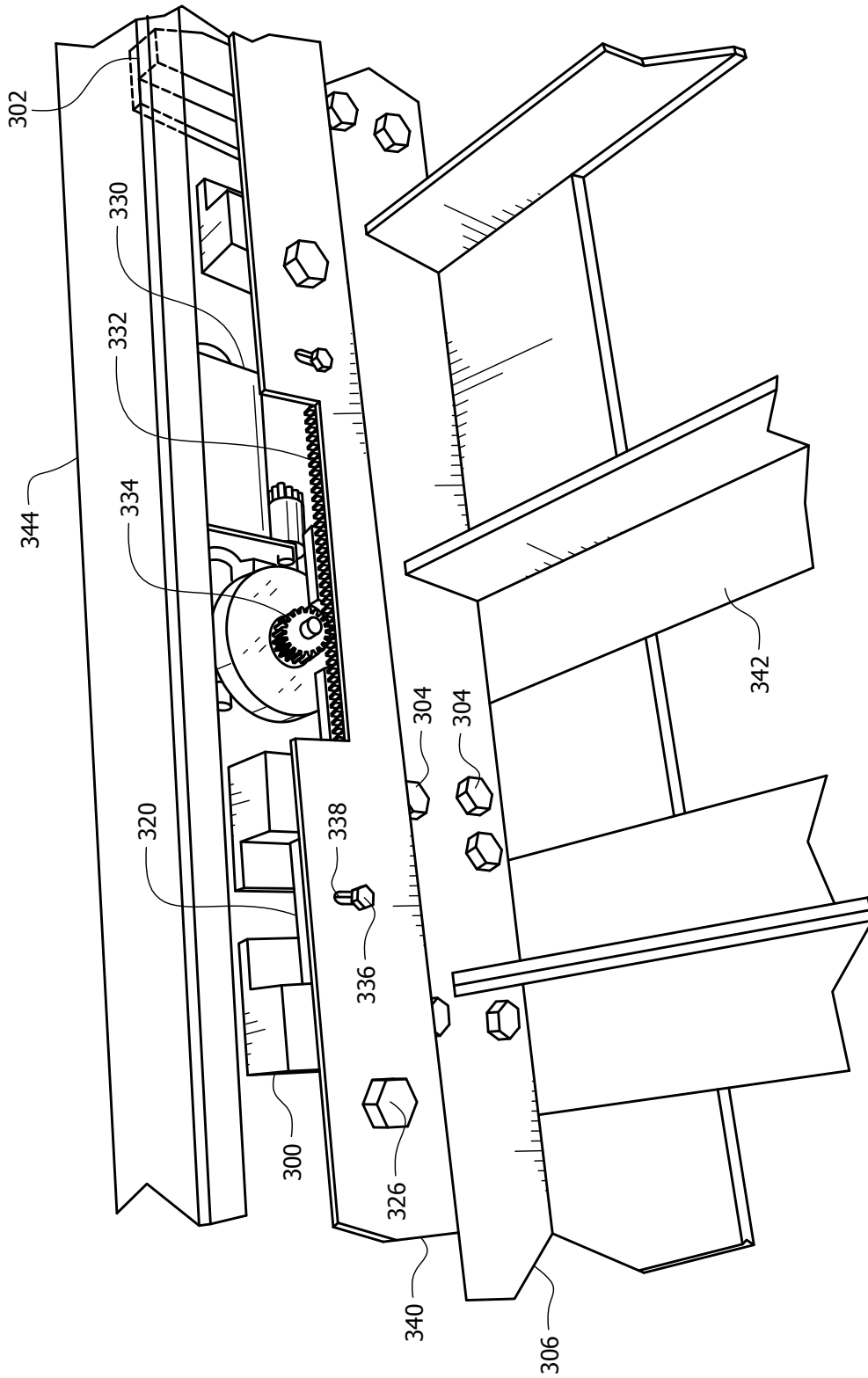


FIG. 18

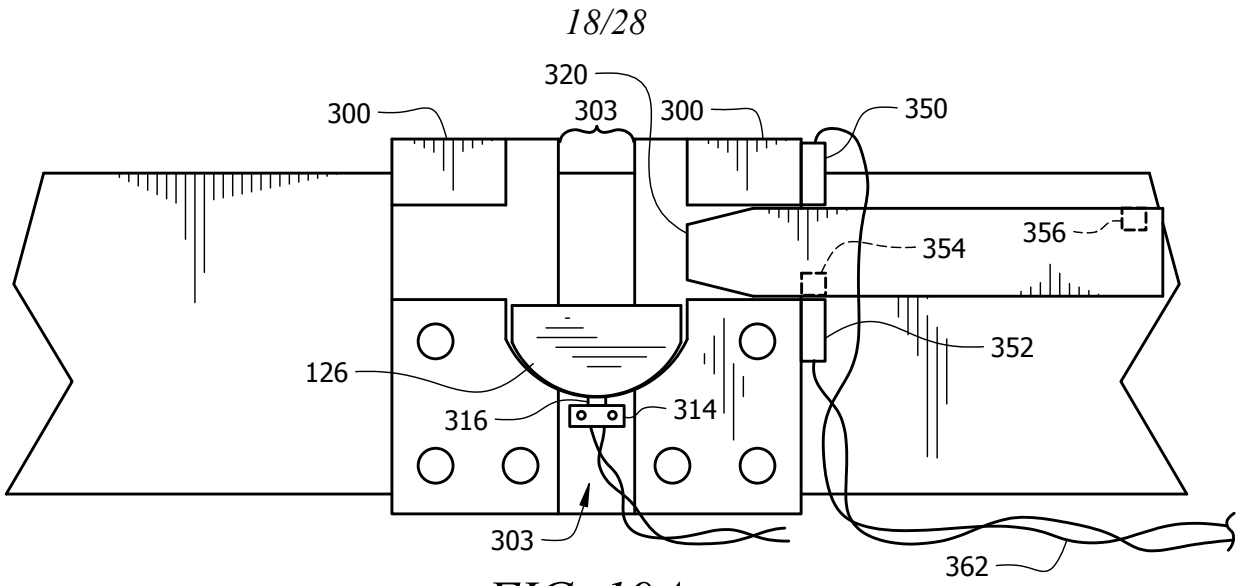


FIG. 19A

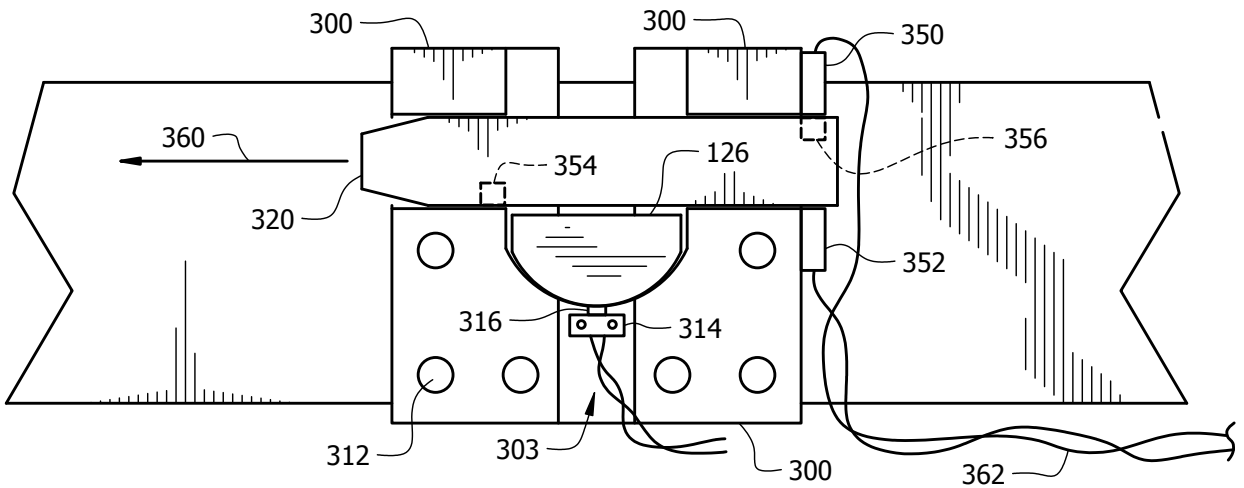


FIG. 19B

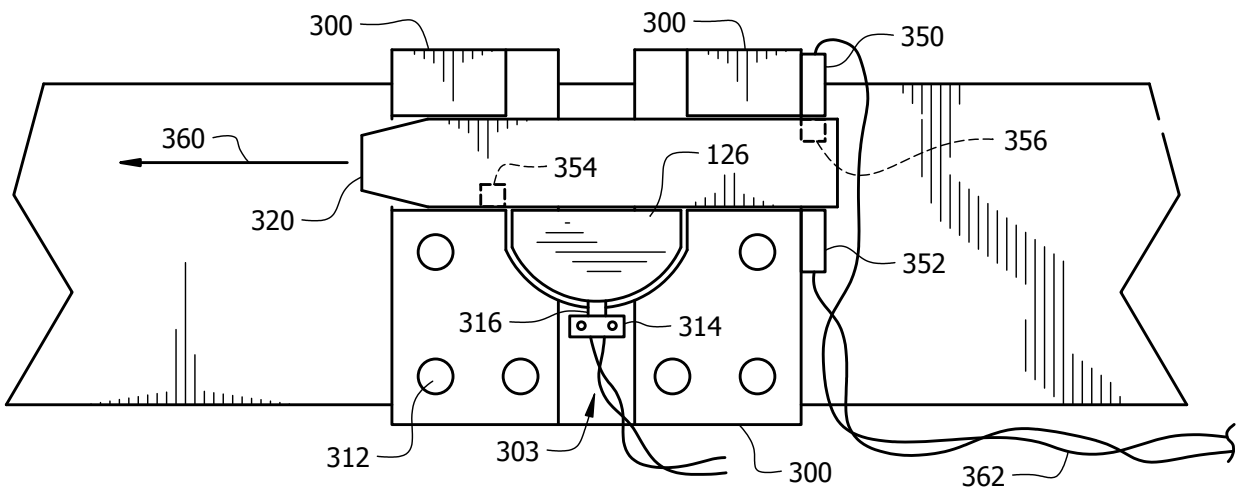


FIG. 19C

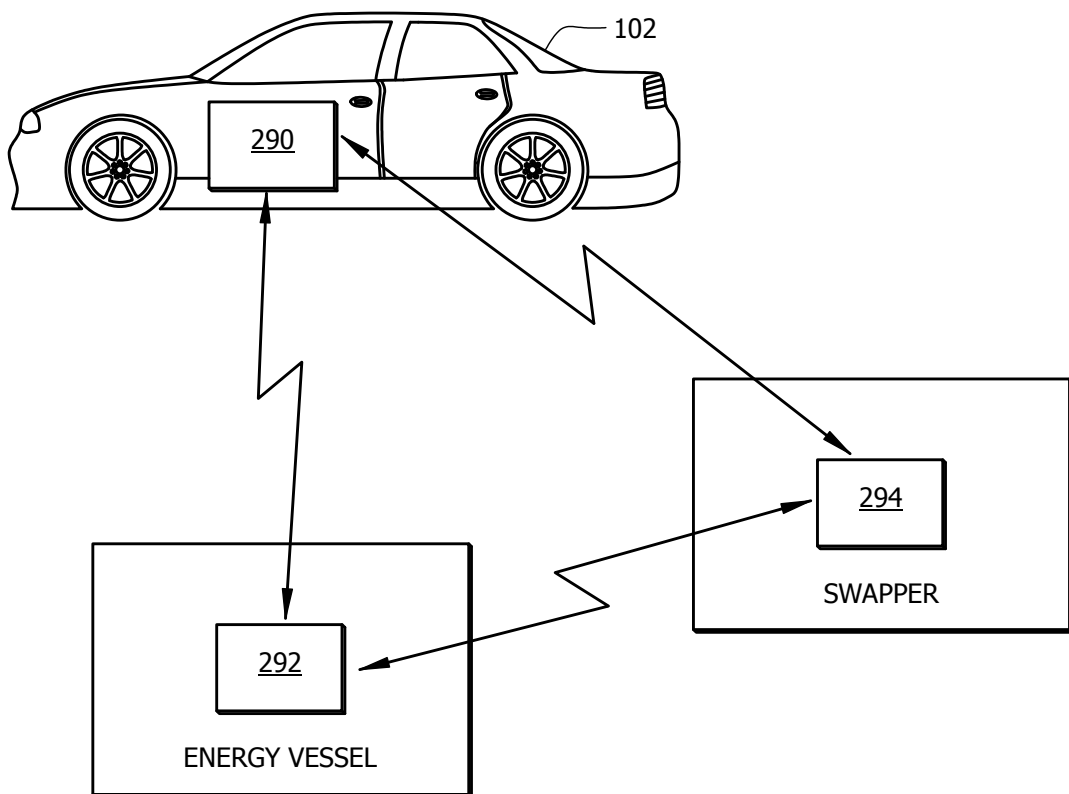
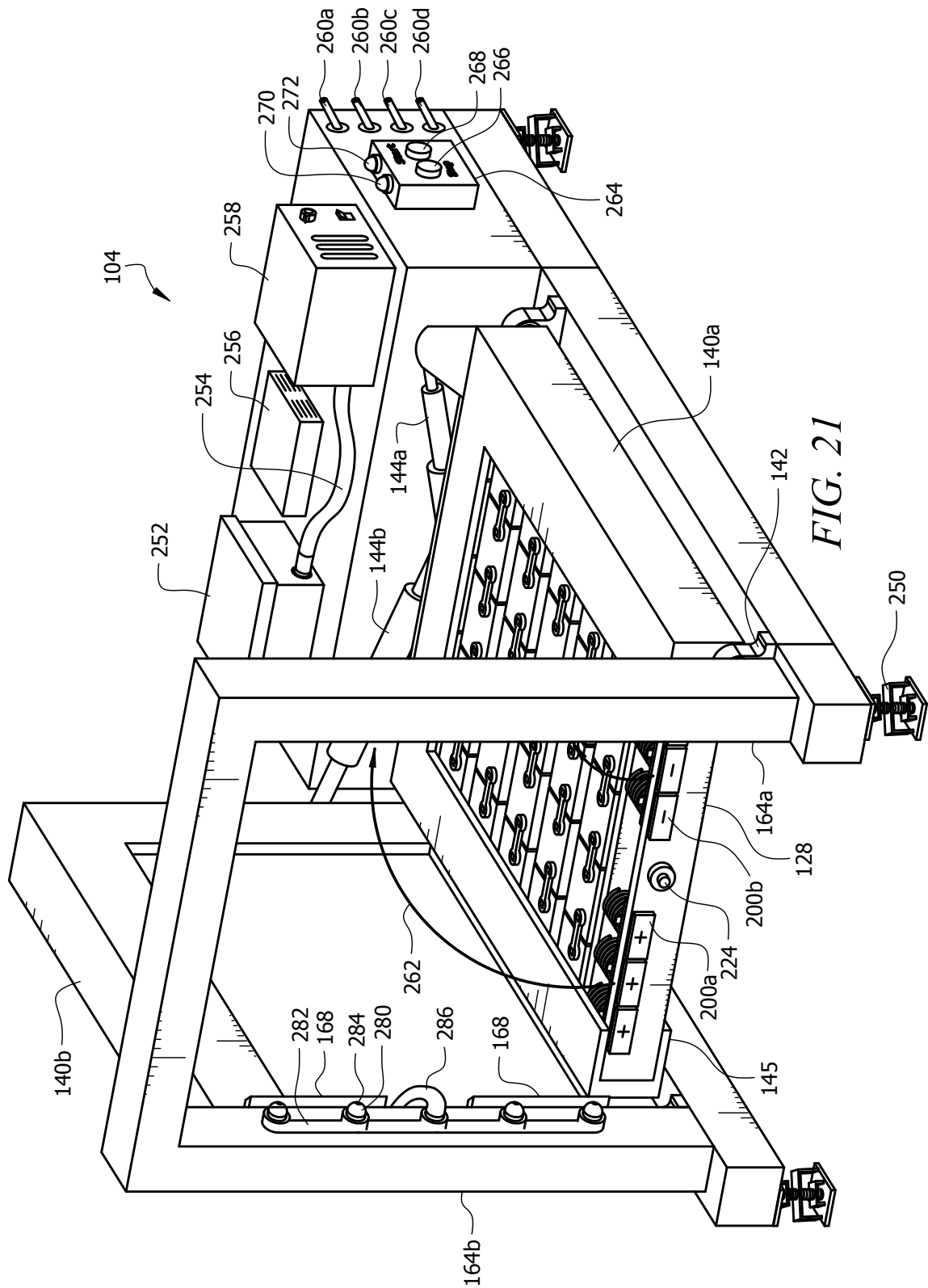


FIG. 20



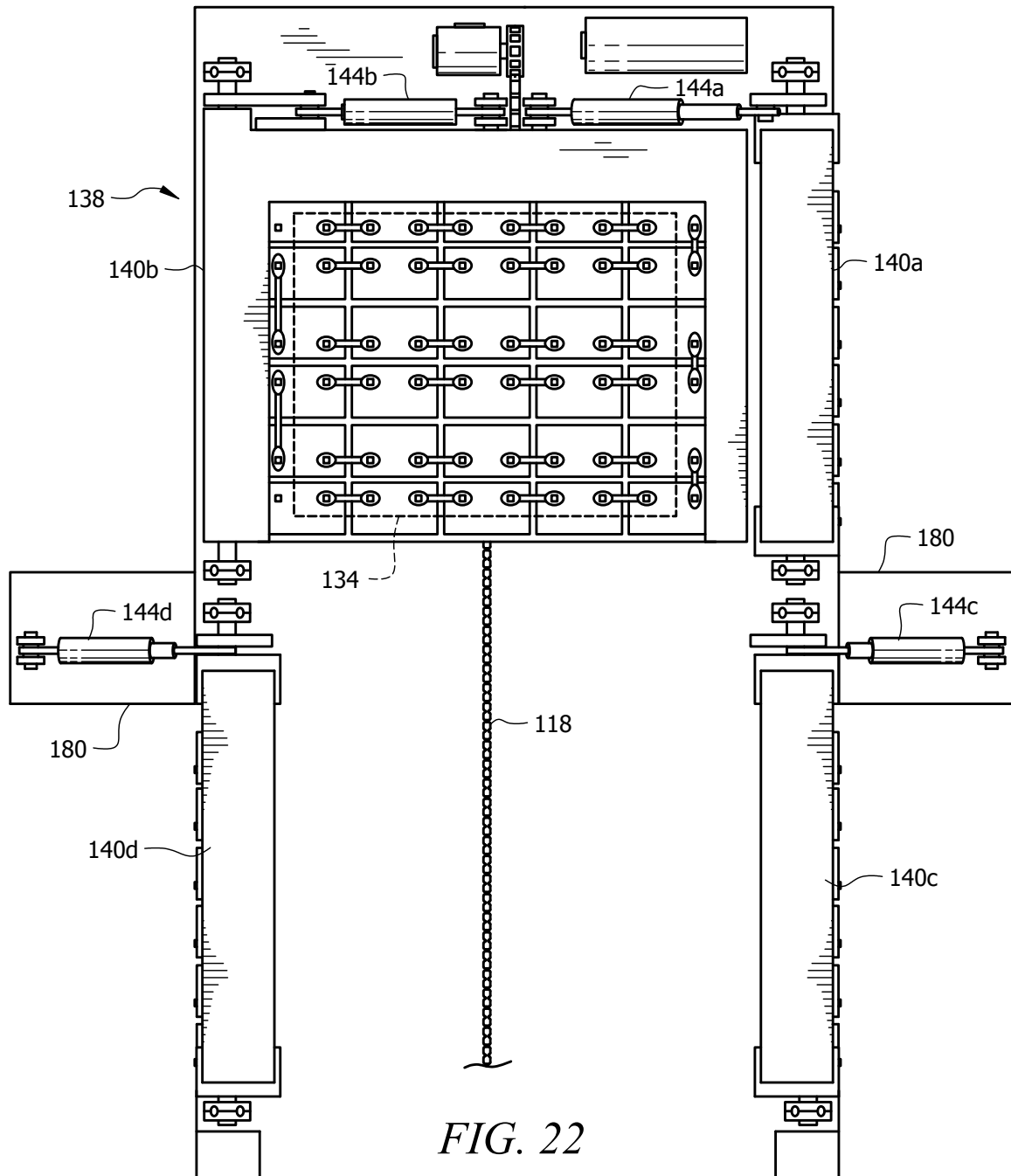
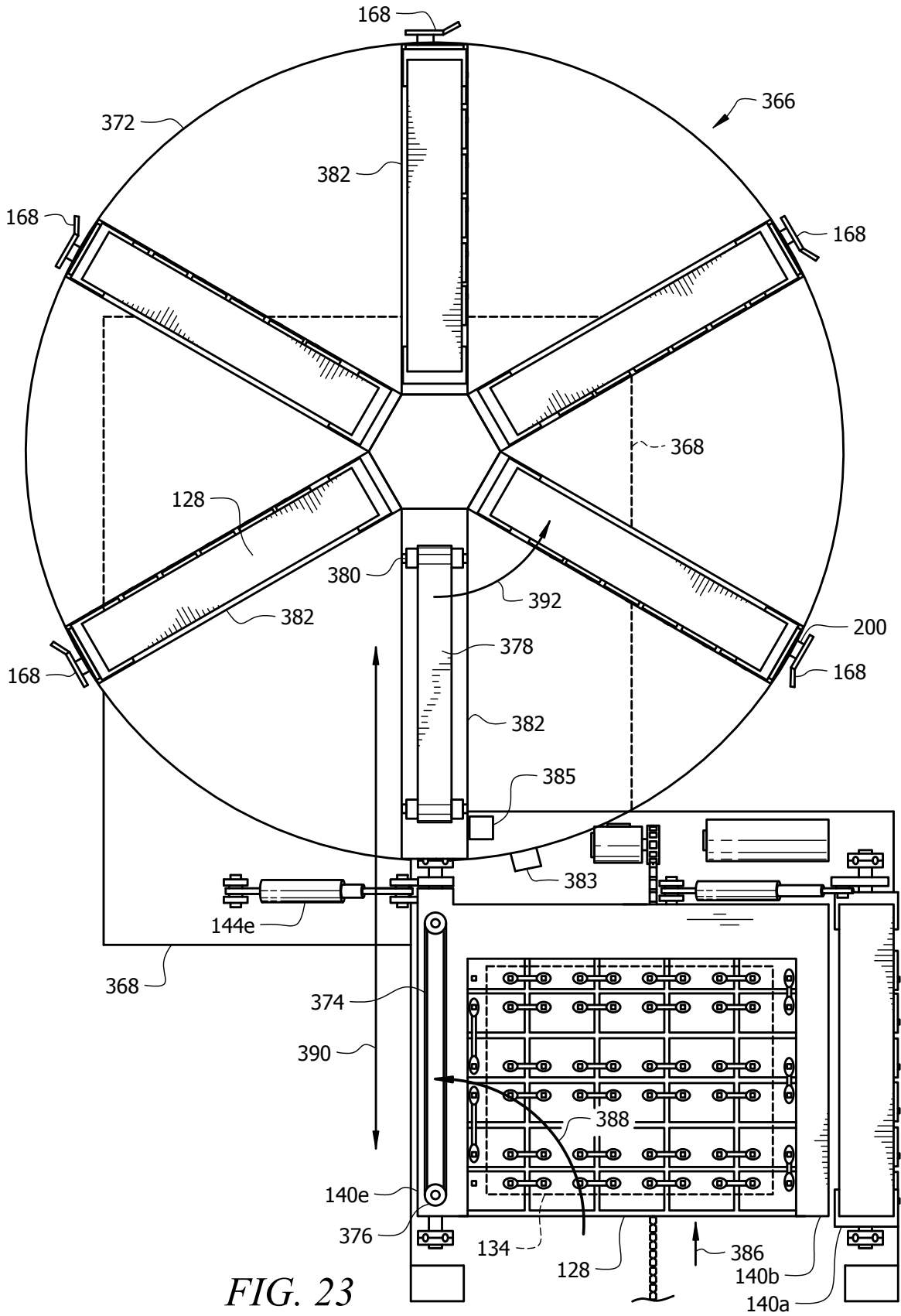


FIG. 22



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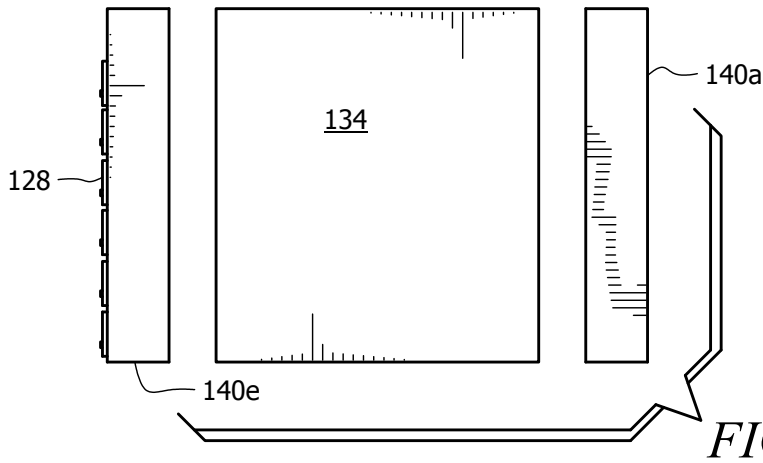


FIG. 23A

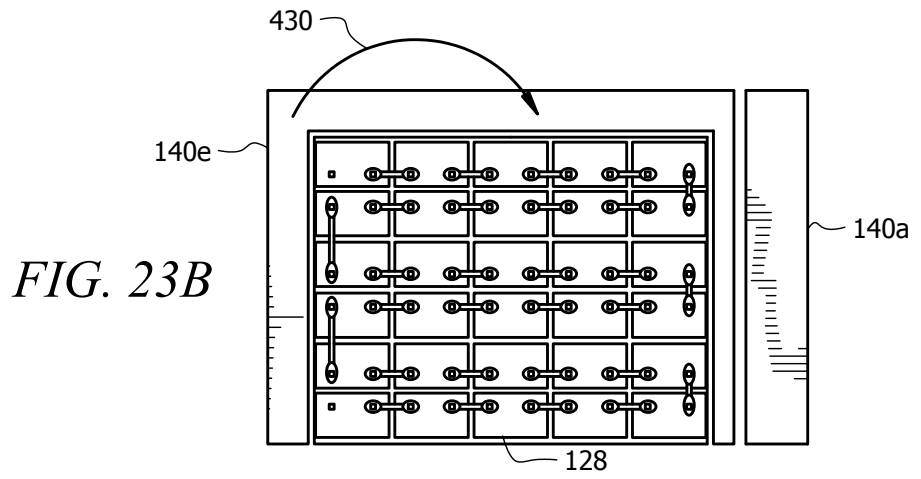


FIG. 23B

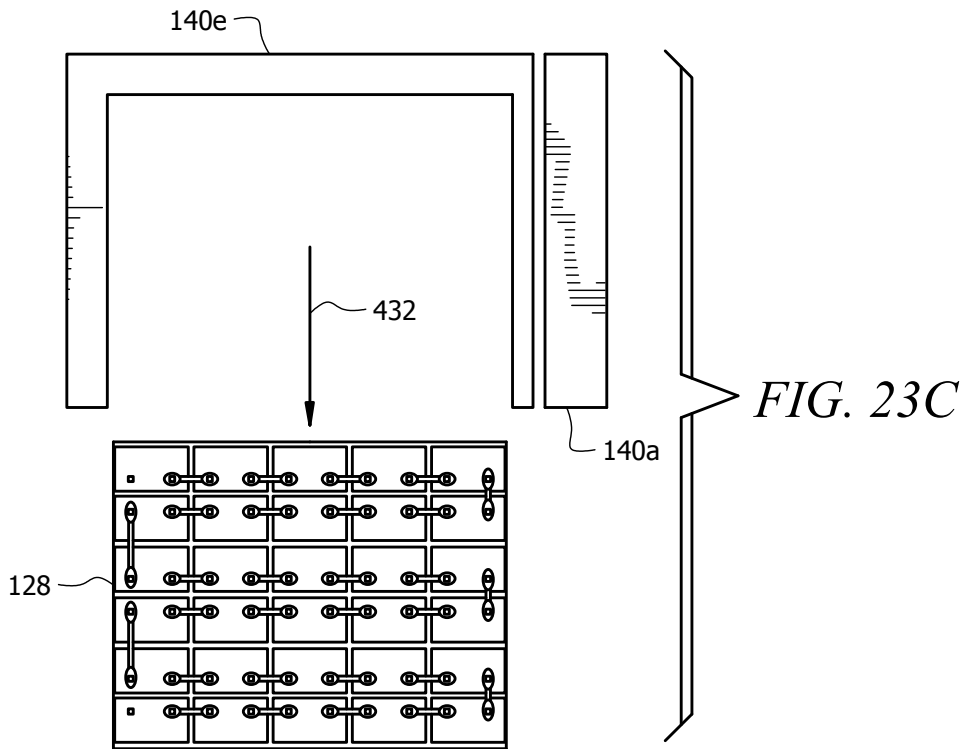
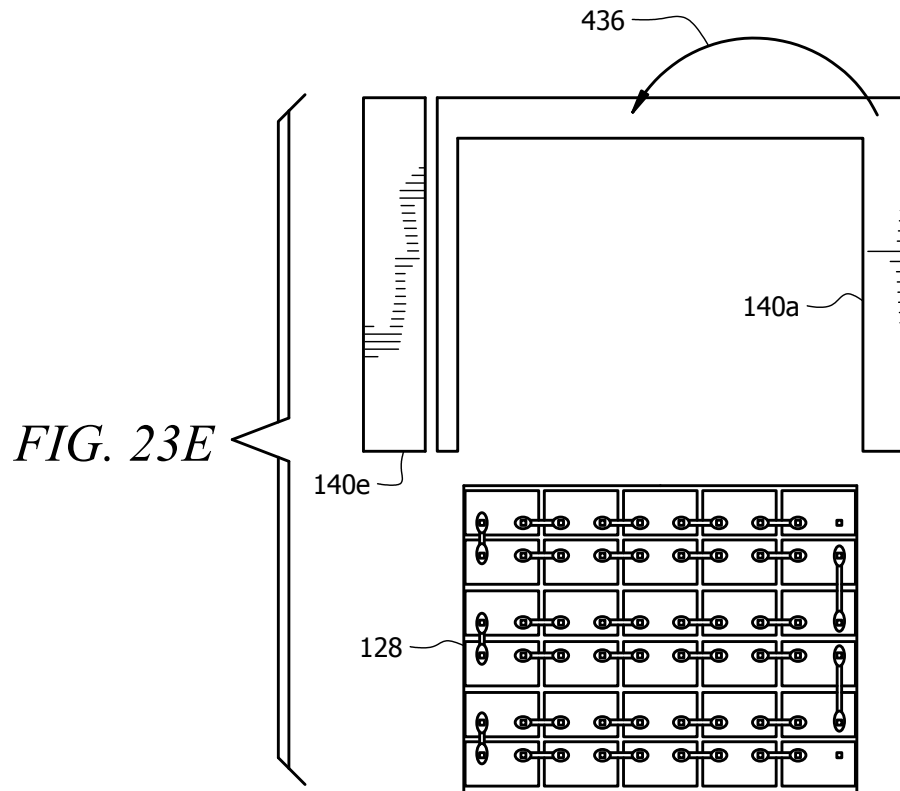
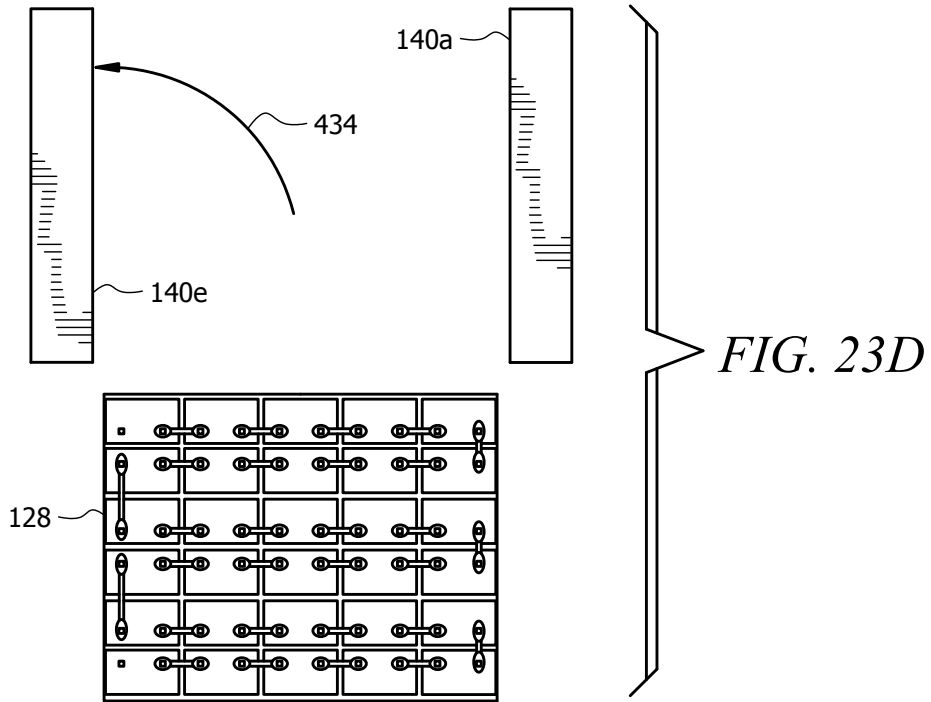


FIG. 23C





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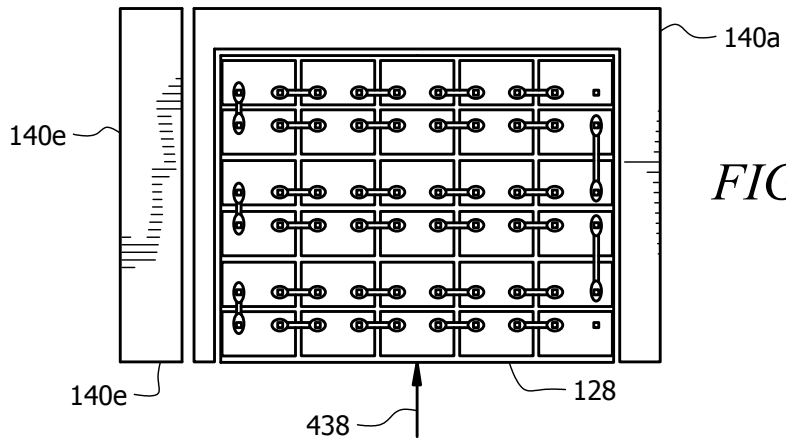


FIG. 23F

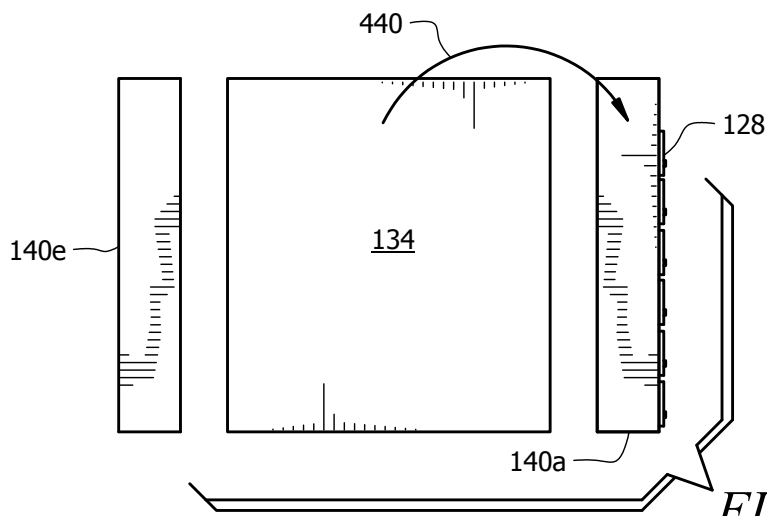


FIG. 23G

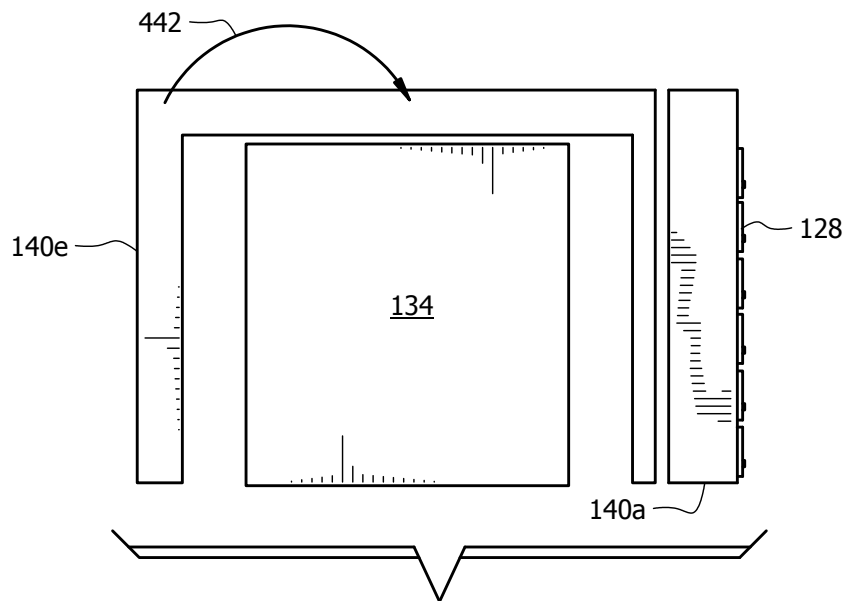


FIG. 23H

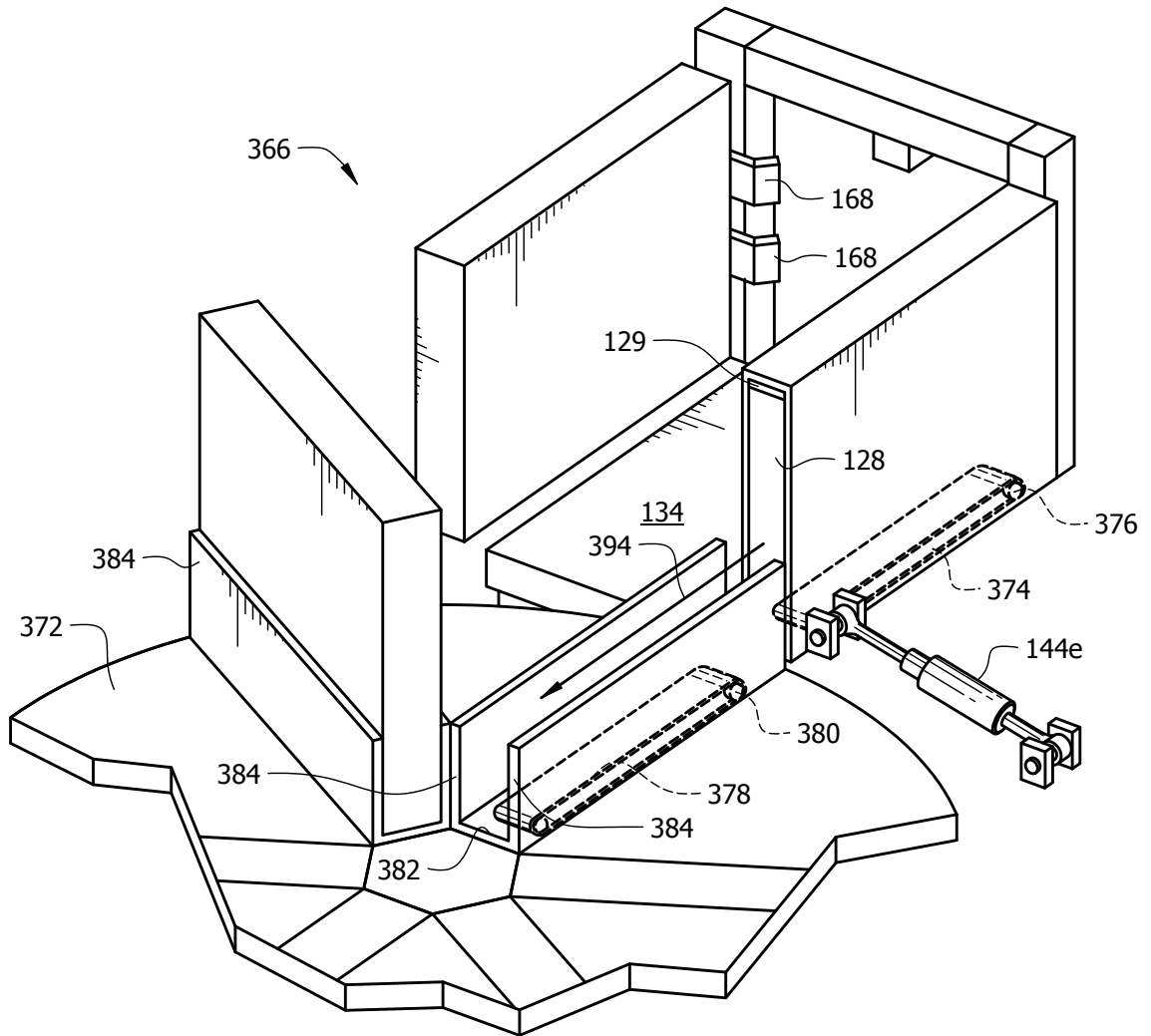


FIG. 23I

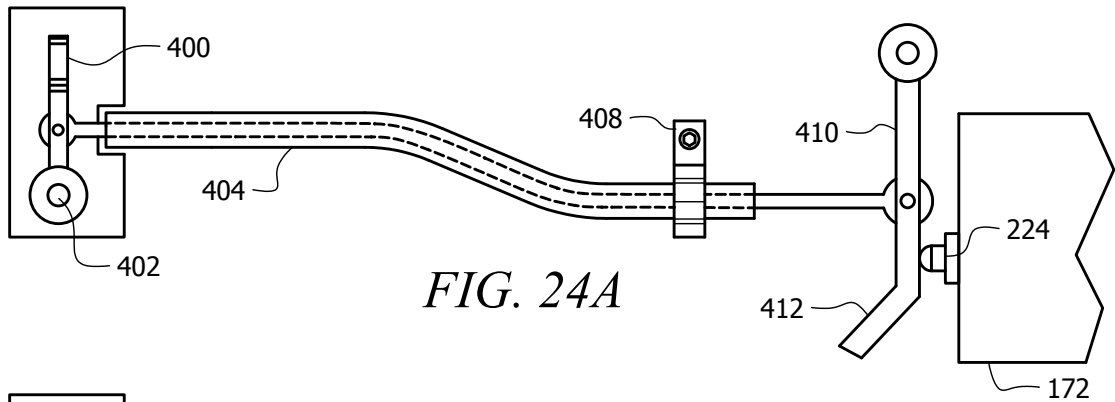


FIG. 24A

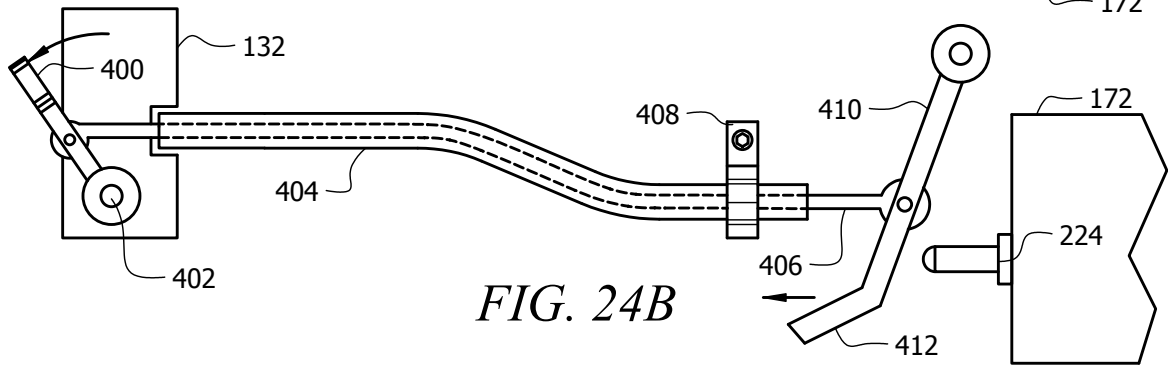


FIG. 24B

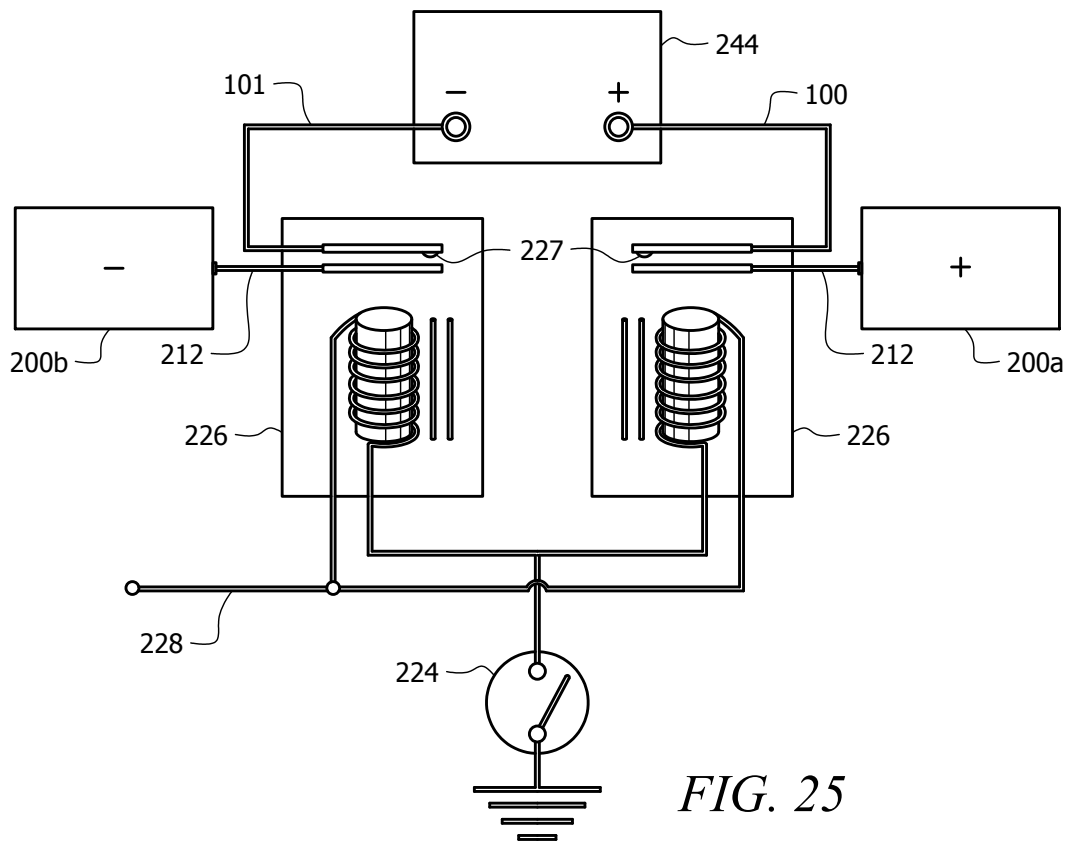
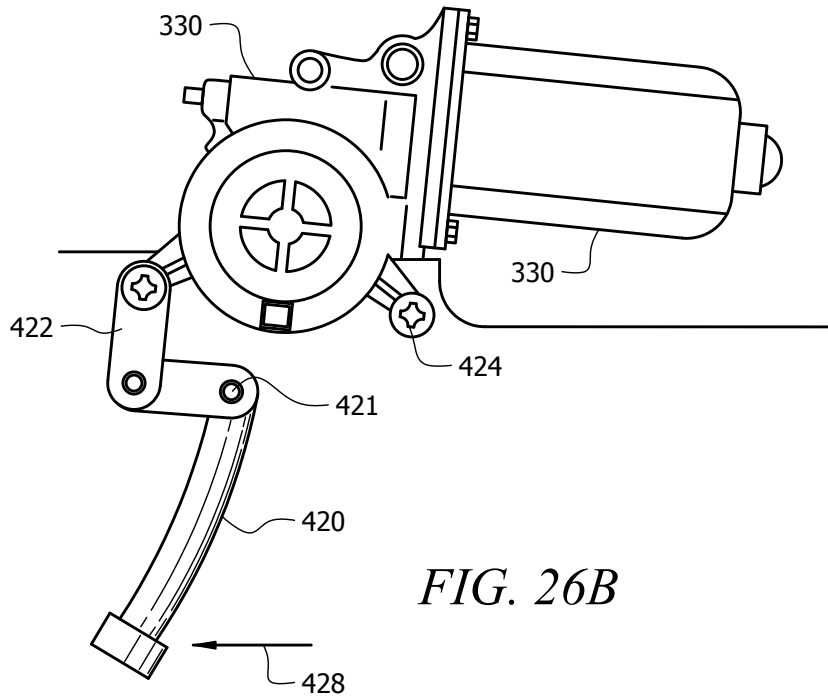
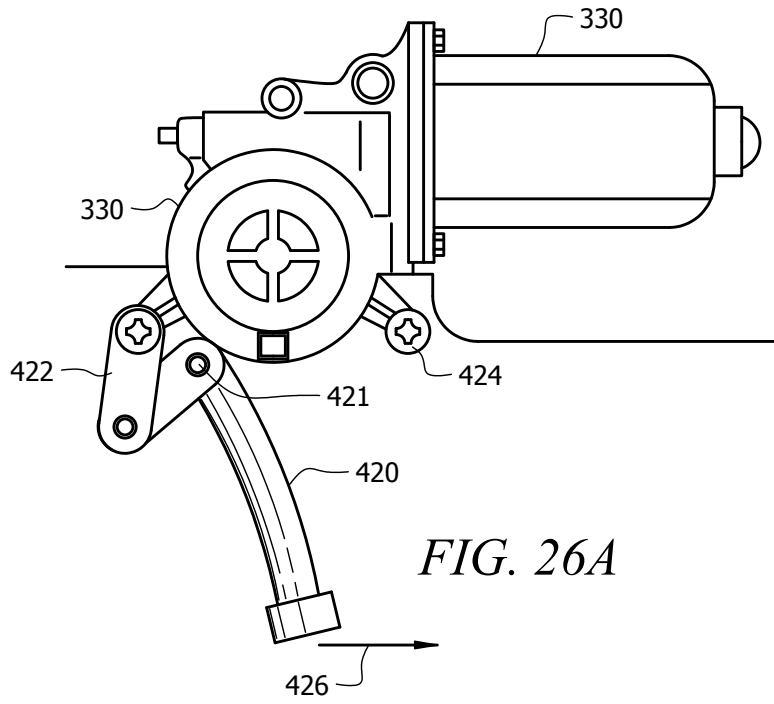


FIG. 25



\* Sides are referenced from the front of the swapper

- 100 Positive Pack Cable
- 101 Negative Pack Cable
- 102 Motor vehicle
- 103 Edge of support pin guide
- 104 Swapping station
- 106 Custom lift hitch
- 108 Hitch alignment spring
- 110a Extended vehicle lift actuator
- 110b Retracted vehicle lift actuator
- 112a Compressed rear suspension
- 112b Expanded rear suspension
- 114a Compressed front suspension
- 114b Expanded front suspension
- 116 Transport cart drive motor
- 118 Drive chain
- 119 Out cart direction
- 120 Actuator drive pump
- 121 Cable extension transducer
- 122 Transducer line
- 123 Cart height actuator
- 124 High current connection position
- 125 Support pin vehicle location
- 126 Support pin
- 126a Insertion stop support pin
- 126b Support pin locking position
- 126d Support pin lip
- 126e Support pin shaft
- 126f Support pin threads
- 127 Cart height detector
- 128 Energy vessel
- 129 Energy vessel opening
- 130 Vehicle contact plate mount
- 132 Emergency power disconnect
- 133 Cart base
- 134 Transport cart
- 135 Cart jack
- 136 In cart direction
- 137 Cart top
- 138 Four position converter swapper
- 139 Energy vessel in converter trigger
- 140a Right side position converter
- 140b Left side position converter

140c Right front side position converter  
140d Left front side position converter  
140e Left side open back position converter  
141 Energy vessel in converter sensor  
142 Bearing block  
143 Energy vessel in converter signal line  
144a Right side position actuator  
144b Left side position actuator  
144c Right front side position actuator  
144d Left front side position actuator  
144e Left side open back lift position actuator  
145 Bottom support flange  
146 Hitch adapter up sensor  
147 Hitch adapter trigger  
148 Hitch adapter down sensor  
150 Transport cart tether  
154 Cart wheel support  
156 Transport cart wheel  
156a Grooved transport cart wheel  
158 Transport cart rail  
160 Custom lift hitch adapter  
164a Right side upright support  
164b Left side upright support  
166 High current contact support  
168 High current contact  
170a Right side lift bell crank  
170b Left side lift bell crank  
172 Brush box  
176 Lift arm shaft  
180 Swapper base  
200 High current brush  
200a Positive brush  
200b Negative brush  
201 Brush bevel  
203 High current contact tail  
204 Brush holder  
206 Brush spring force direction  
208 Linear brush engagement motion  
210 Brush travel stop  
212 Brush shunt  
214 Brush shunt terminal  
218 Brush tension spring  
220 Spring back stop  
224 Emergency power cutoff button  
226 High current contactor  
227 Electrical contact

228 Contactor power signal  
230 Energy vessel operator interface control  
232 Latch pawl direction selector  
234 Energy vessel power control  
236 Latch pawls latched indicator  
238 Latch pawls unlatched indicator  
240 Energy vessel electronic control  
242a Right converter vertical detector  
242b Left converter vertical detector  
243a Right converter horizontal detector  
243b Left converter horizontal detector  
244 Electrochemical Battery  
246 Battery inter-connector  
250 Swapping machine height adjuster  
252 AC power box  
254 Battery charger AC power feed  
256 Auto swap electronic control  
258 Energy vessel battery charger  
260a Manual vehicle lift actuator control  
260b Manual transport cart actuator control  
260c Manual right lift arm actuator control  
260d Manual left lift arm actuator control  
262 Axial brush engagement motion  
264 Auto swap control panel  
266 Emergency stop button  
268 Start auto swap sequence button  
270 Swapper ready indicator  
272 Swap in progress indicator  
280 Clean and lubricate nozzle  
282 Clean and lubricate manifold  
284 Nozzle port  
286 Clean and lubricate feed line  
290 Motor vehicle transceiver  
292 Energy vessel transceiver  
294 Swapping station transceiver  
300 Short support pin guide  
301 Latch pawl support material  
302 Tall support pin guide  
303 Support pin channel  
304 Support pin guide bolt  
305 Stop sensor signal line  
306 Energy vessel main support frame  
307 Insertion stop sensor  
308 Energy Vessel insertion stop  
309 Stop sensor trigger  
310 Motor vehicle support frame

312 Support pin guide bolt hole  
314 Lock detector  
316 Lock detector actuator  
318 Lock detector signal line  
320 Latch pawl  
322 Support pin engagement direction  
324 Manual latch pawl release handle  
326 Linkage bar to latch pawl bolt  
330 Latch pawl drive motor  
332 Latch pawl drive rack  
334 Latch pawl drive motor gear  
336 Latch pawl drive rack bolt  
338 Latch pawl drive rack adjustment slot  
340 Latch pawl linkage bar  
342 Energy vessel cross-support  
344 Upper energy vessel support frame  
350 Latch pawl latched position sensor  
352 Latch pawl open position sensor  
354 Latch pawl open position trigger  
356 Latch pawl latched position trigger  
360 Latch direction  
362 Position sensor signal line  
366 Swapping station with carousel  
368 Carousel base  
370 Energy vessel insertion/removal motion direction  
372 Carousel  
374 Position converter transport belt  
376 Position converter transport belt roller  
378 Carousel transport belt  
380 Carousel transport belt roller  
382 Energy vessel carousel slot  
383 Slot position detector  
384 Carousel slot support  
385 Slot full  
386 Energy vessel into lift arm direction  
388 Rotation from horizontal to vertical position  
390 Energy vessel movement direction  
392 Carousel rotation direction  
394 Vessel onto carousel direction  
400 Emergency cutoff handle  
402 Cutoff-handle pivot point  
404 Cutoff cable housing  
406 Cutoff cable  
408 Cutoff cable housing clamp  
410 Cutoff actuator  
412 Cutoff actuator tail



420 Motor release lever  
421 Motor release pivot point  
422 Motor release link  
424 Motor pivot point  
426 Motor drive direction  
428 Motor release direction  
430 Rotate vertical to horizontal direction  
432 Moves out direction  
434 Moves horizontal to vertical direction  
436 Moves vertical to horizontal direction  
438 Moves in direction  
440 Moves horizontal to vertical direction  
442 Moves vertical to horizontal direction