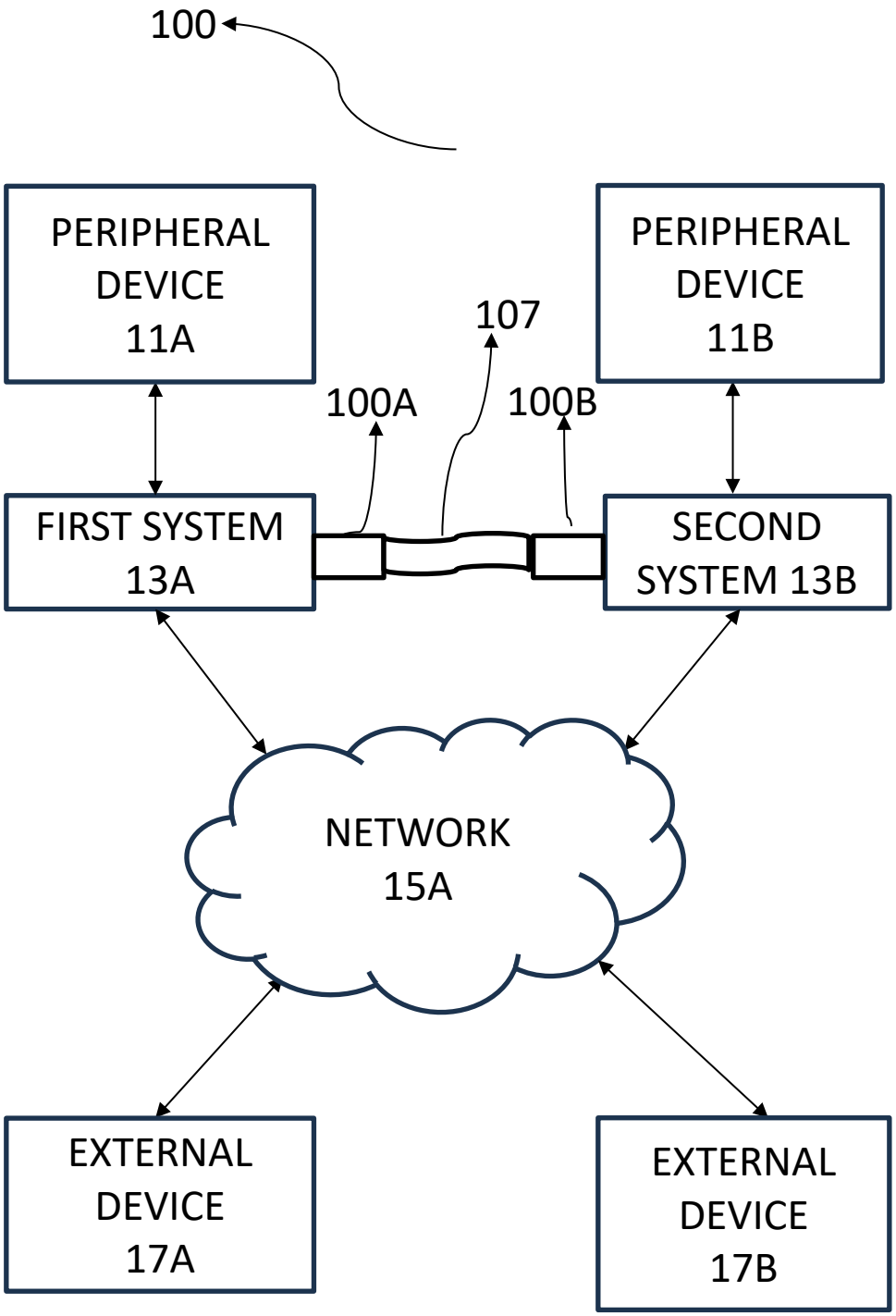

100
PERIPHERAL DEVICE 11A
PERIPHERAL DEVICE 11B
107
100A
100B
FIRST SYSTEM 13A
SECOND SYSTEM 13B
NETWORK 15A
EXTERNAL DEVICE 17A
EXTERNAL DEVICE 17B

FIG.1A

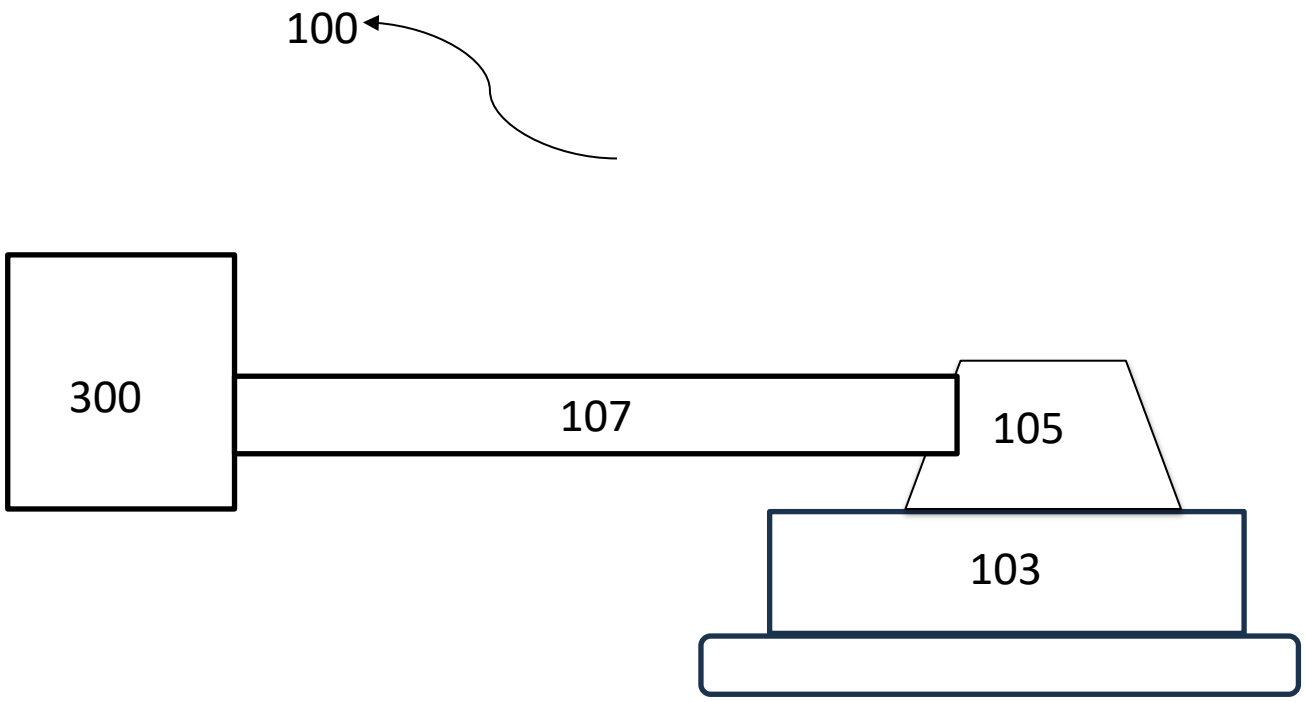


FIG.1B

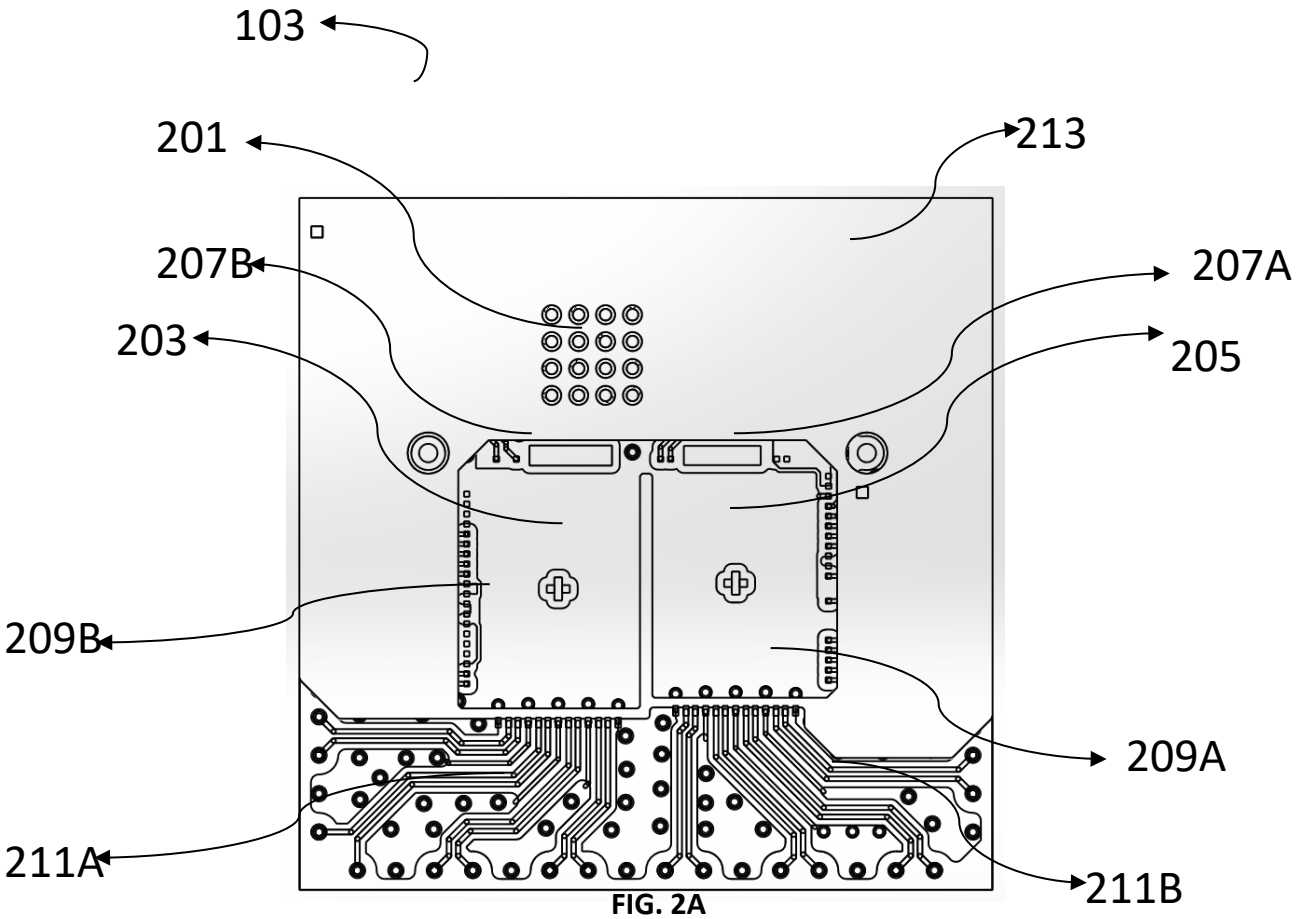


FIG. 2A

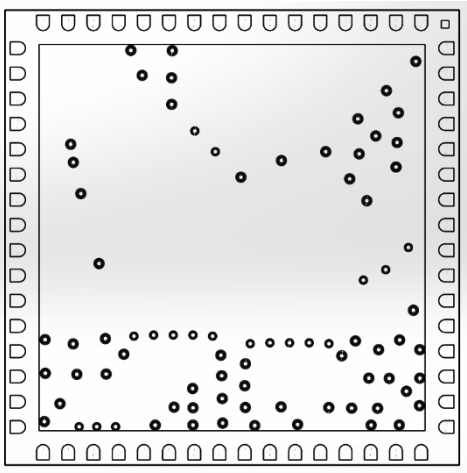


FIG. 2B

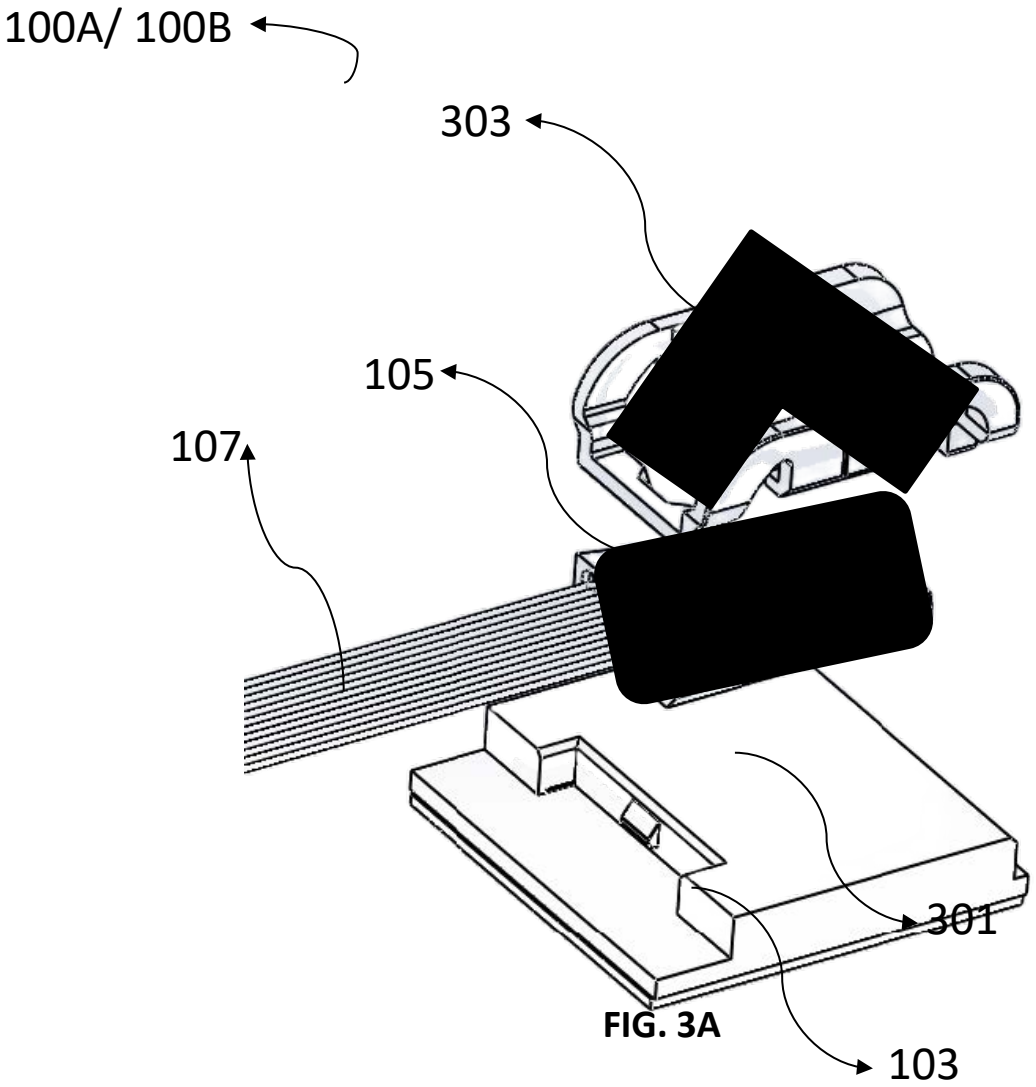


FIG. 3A

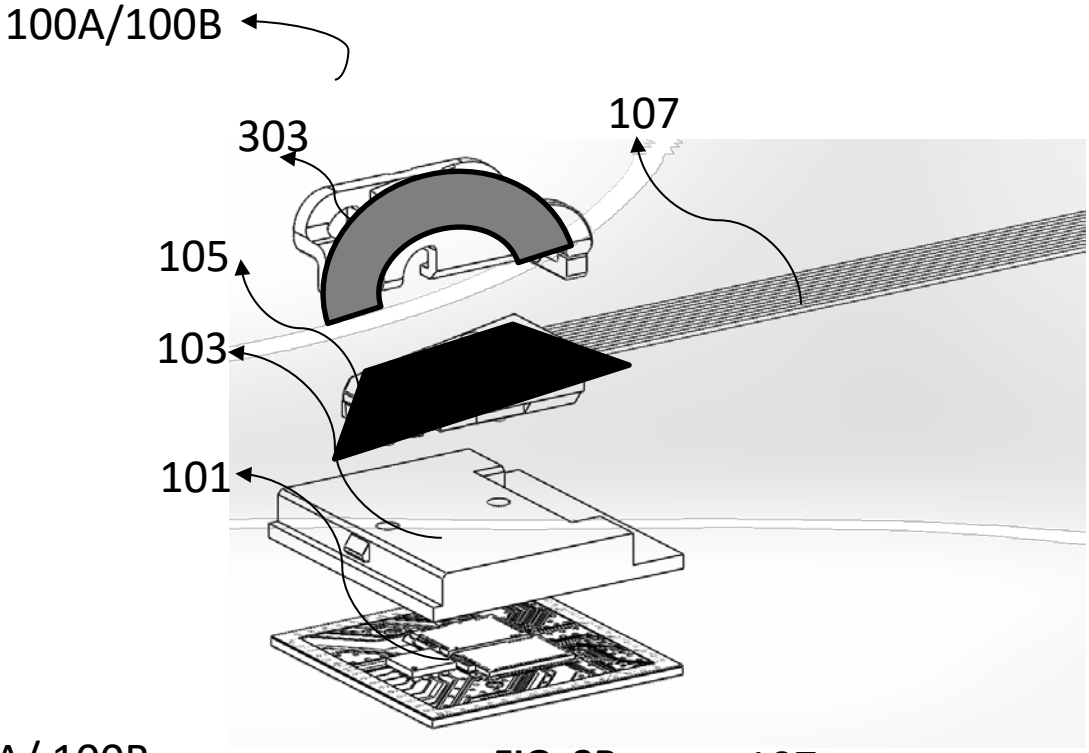


FIG. 3B

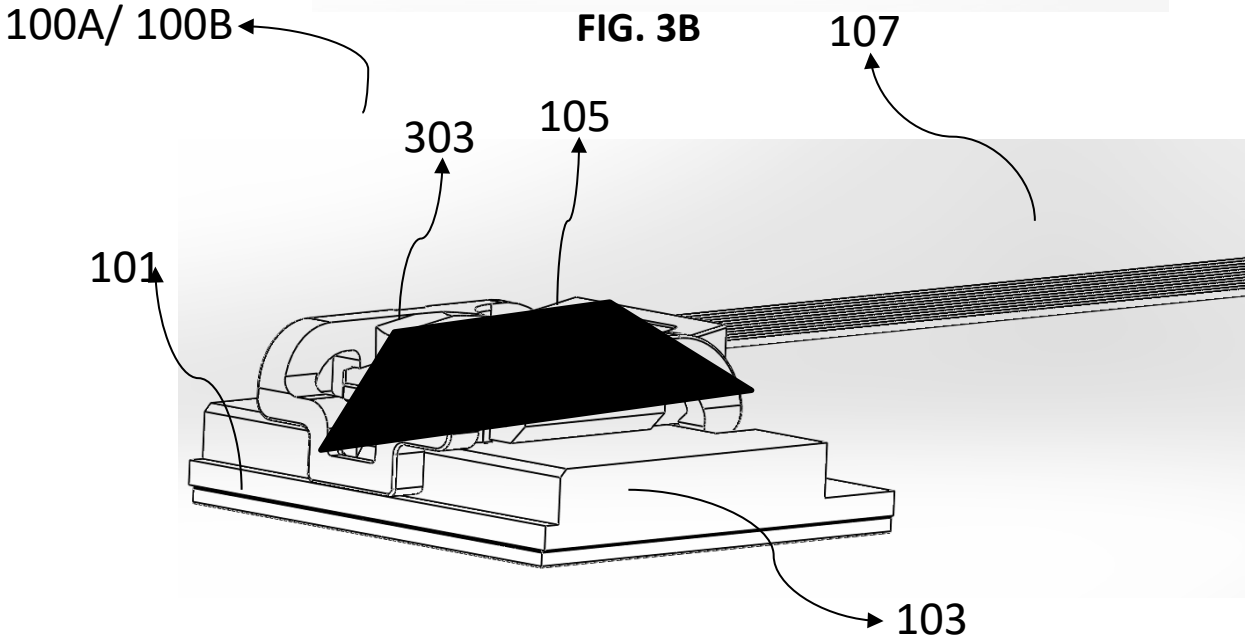


FIG. 3C



FIG. 4A

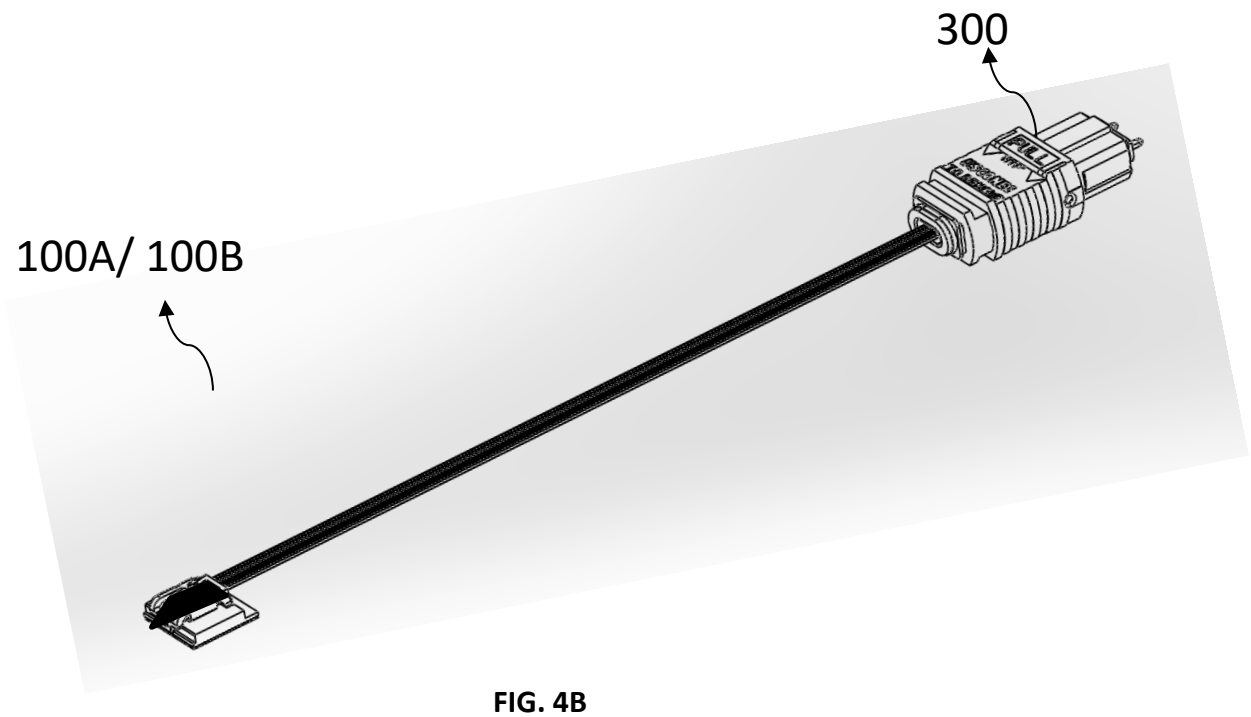


FIG. 4B



FIG. 4C

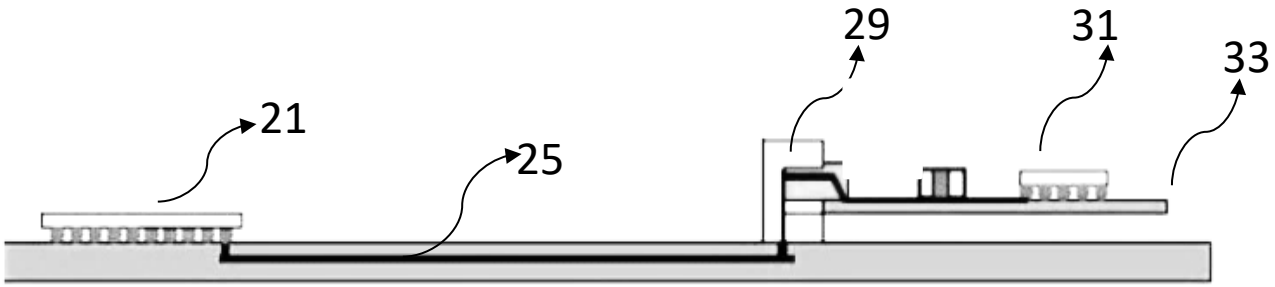


FIG. 4D

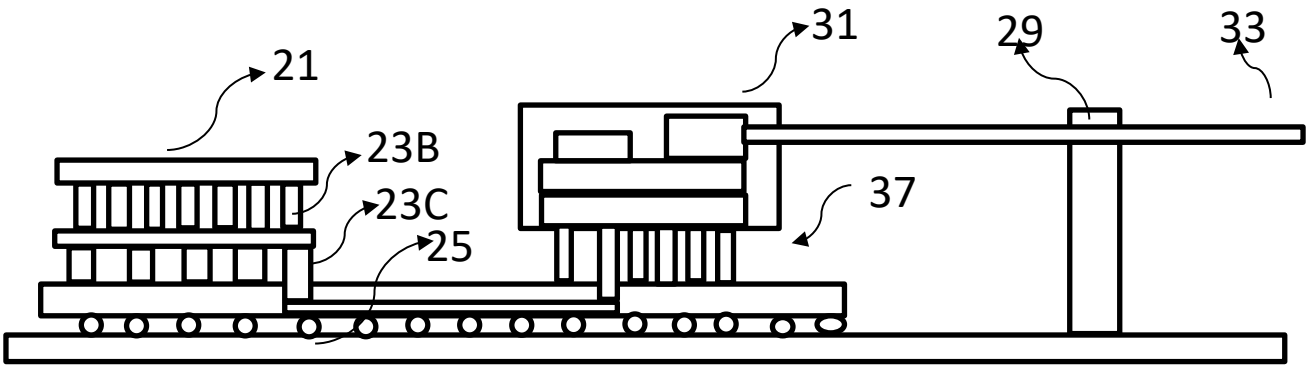


FIG. 4E

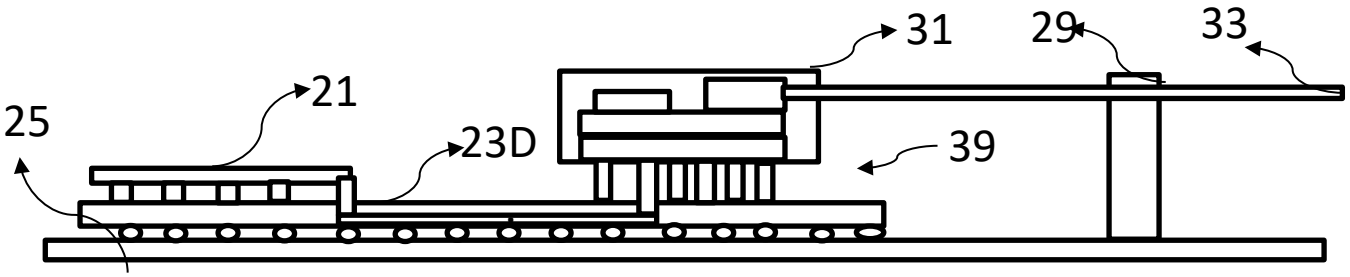


FIG. 4F

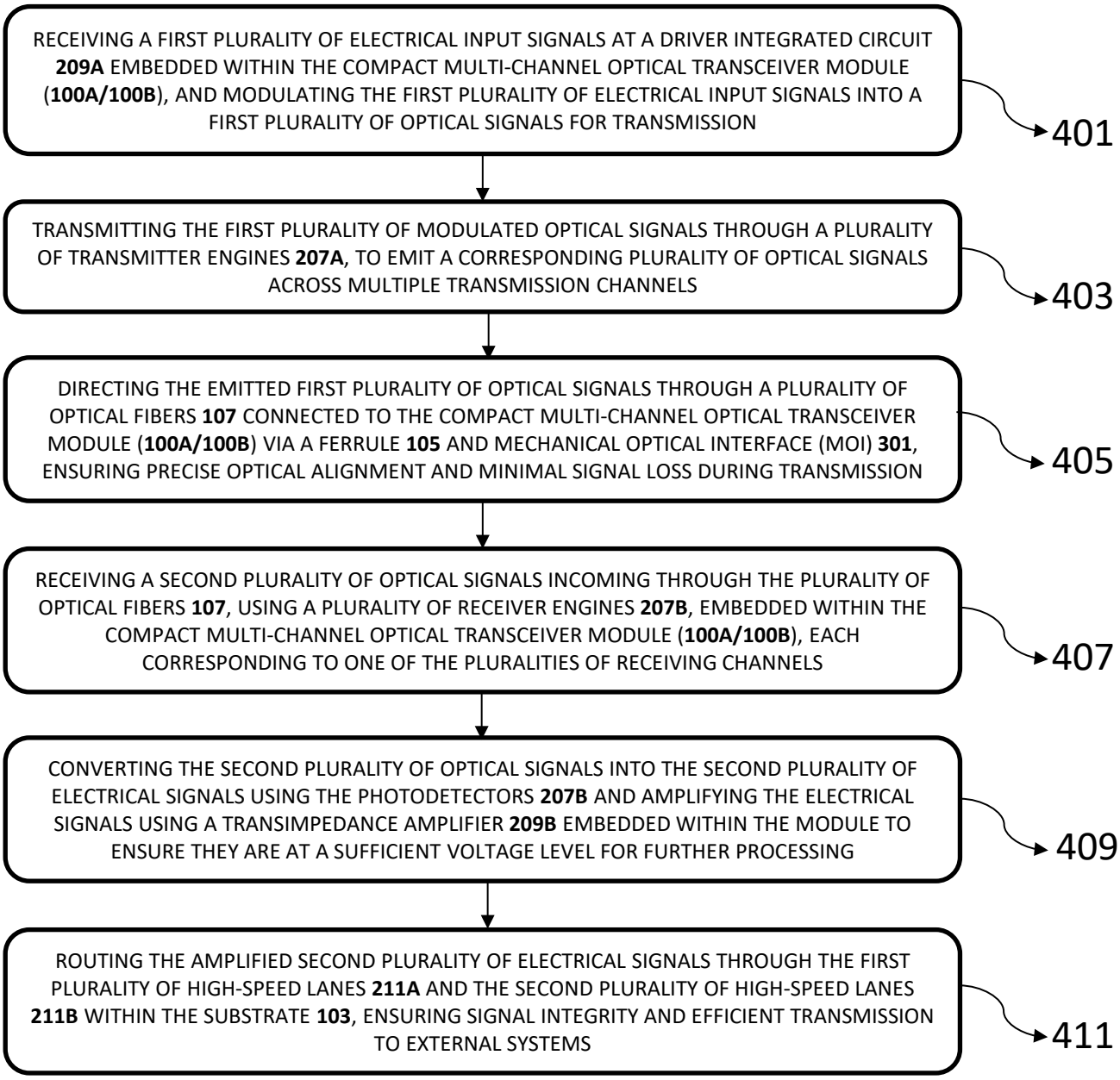

RECEIVING A FIRST PLURALITY OF ELECTRICAL INPUT SIGNALS AT A DRIVER INTEGRATED CIRCUIT **209A** EMBEDDED WITHIN THE COMPACT MULTI-CHANNEL OPTICAL TRANSCEIVER MODULE (**100A/100B**), AND MODULATING THE FIRST PLURALITY OF ELECTRICAL INPUT SIGNALS INTO A FIRST PLURALITY OF OPTICAL SIGNALS FOR TRANSMISSION
401
TRANSMITTING THE FIRST PLURALITY OF MODULATED OPTICAL SIGNALS THROUGH A PLURALITY OF TRANSMITTER ENGINES **207A**, TO EMIT A CORRESPONDING PLURALITY OF OPTICAL SIGNALS ACROSS MULTIPLE TRANSMISSION CHANNELS
403
DIRECTING THE EMITTED FIRST PLURALITY OF OPTICAL SIGNALS THROUGH A PLURALITY OF OPTICAL FIBERS **107** CONNECTED TO THE COMPACT MULTI-CHANNEL OPTICAL TRANSCEIVER MODULE (**100A/100B**) VIA A FERRULE **105** AND MECHANICAL OPTICAL INTERFACE (MOI) **301**, ENSURING PRECISE OPTICAL ALIGNMENT AND MINIMAL SIGNAL LOSS DURING TRANSMISSION
405
RECEIVING A SECOND PLURALITY OF OPTICAL SIGNALS INCOMING THROUGH THE PLURALITY OF OPTICAL FIBERS **107**, USING A PLURALITY OF RECEIVER ENGINES **207B**, EMBEDDED WITHIN THE COMPACT MULTI-CHANNEL OPTICAL TRANSCEIVER MODULE (**100A/100B**), EACH CORRESPONDING TO ONE OF THE PLURALITIES OF RECEIVING CHANNELS
407
CONVERTING THE SECOND PLURALITY OF OPTICAL SIGNALS INTO THE SECOND PLURALITY OF ELECTRICAL SIGNALS USING THE PHOTODETECTORS **207B** AND AMPLIFYING THE ELECTRICAL SIGNALS USING A TRANSIMPEDANCE AMPLIFIER **209B** EMBEDDED WITHIN THE MODULE TO ENSURE THEY ARE AT A SUFFICIENT VOLTAGE LEVEL FOR FURTHER PROCESSING
409
ROUTING THE AMPLIFIED SECOND PLURALITY OF ELECTRICAL SIGNALS THROUGH THE FIRST PLURALITY OF HIGH-SPEED LANES **211A** AND THE SECOND PLURALITY OF HIGH-SPEED LANES **211B** WITHIN THE SUBSTRATE **103**, ENSURING SIGNAL INTEGRITY AND EFFICIENT TRANSMISSION TO EXTERNAL SYSTEMS
411

FIG. 4G

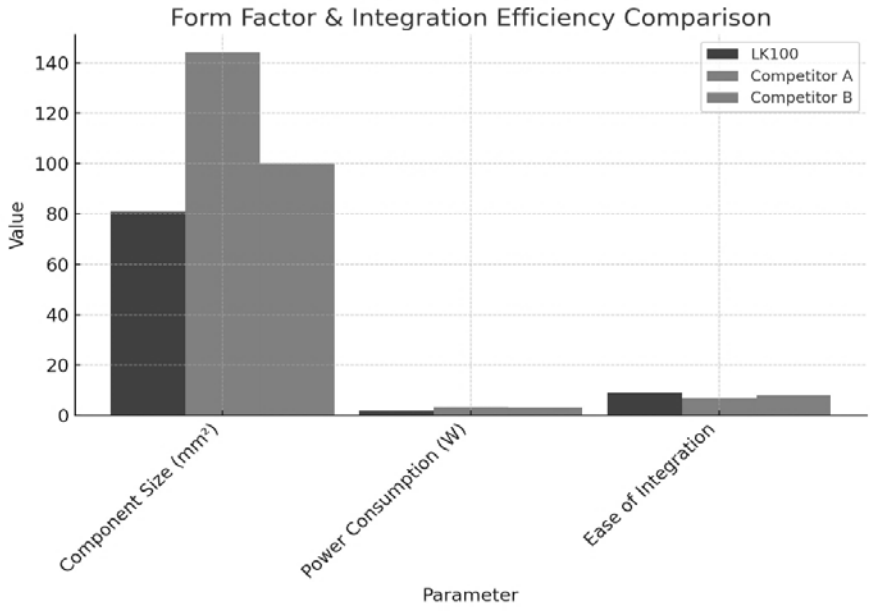

Form Factor & Integration Efficiency Comparison
LK100
Competitor A
Competitor B
Value
0
20
40
60
80
100
120
140
Component Size (mm²)
Power Consumption (W)
Ease of Integration
Parameter

FIG. 5A

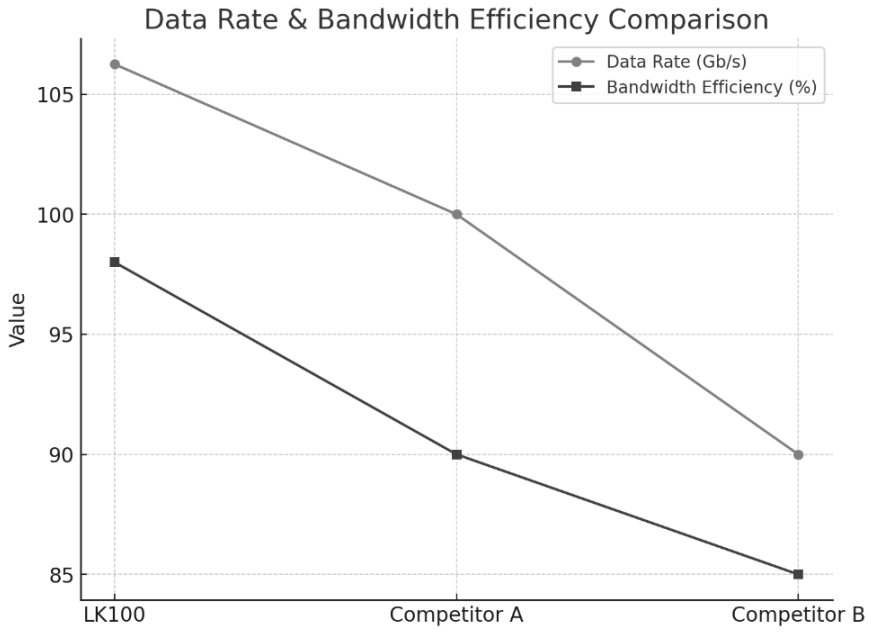

Data Rate & Bandwidth Efficiency Comparison
Data Rate (Gb/s)
Bandwidth Efficiency (%)
Value
85
90
95
100
105
LK100
Competitor A
Competitor B

FIG. 5B

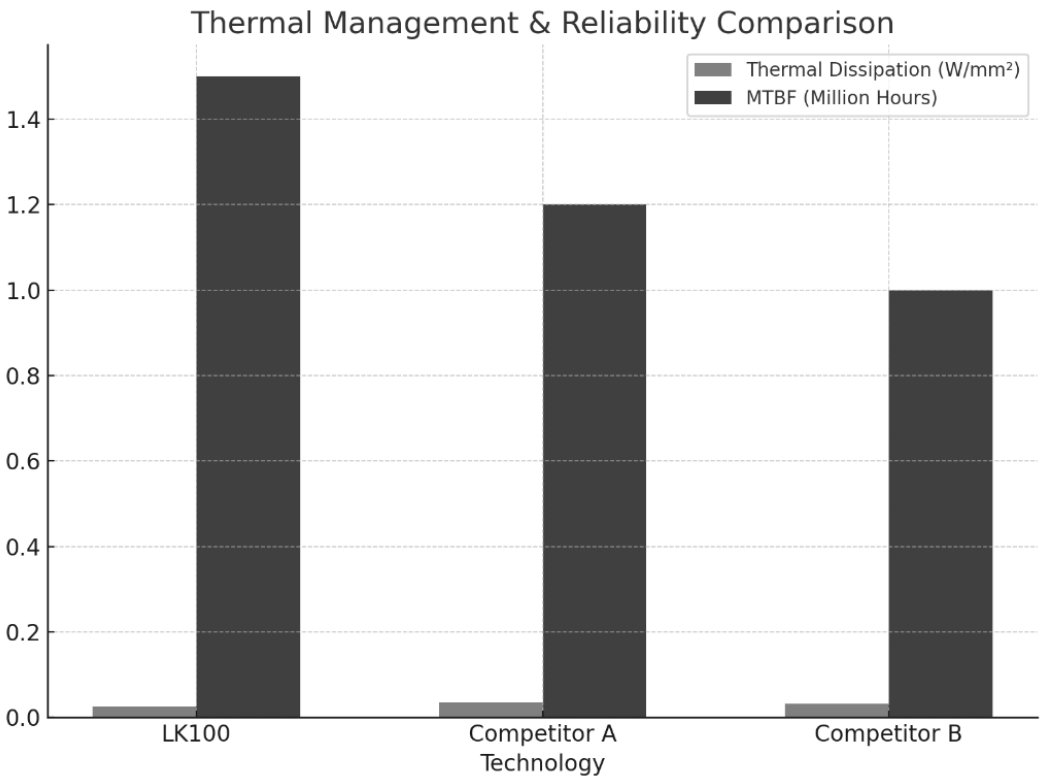

Thermal Management & Reliability Comparison
Thermal Dissipation (W/mm²)
MTBF (Million Hours)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
LK100
Competitor A
Technology
Competitor B

FIG. 5C