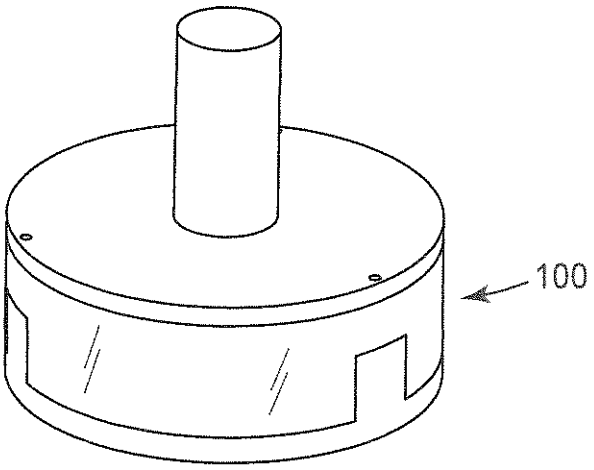


FIG. 1A

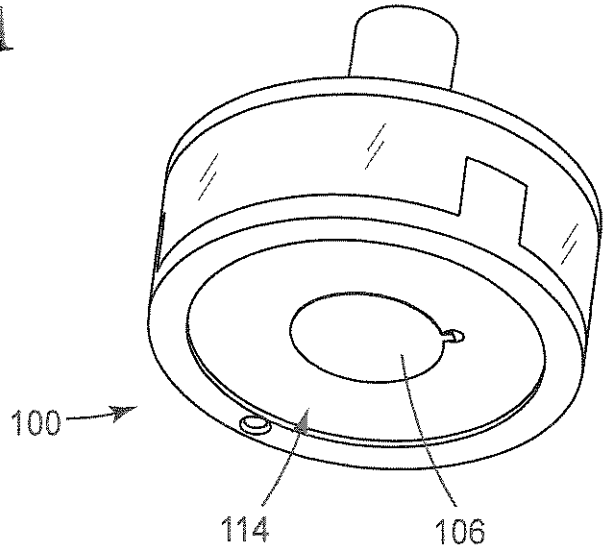


FIG. 1B

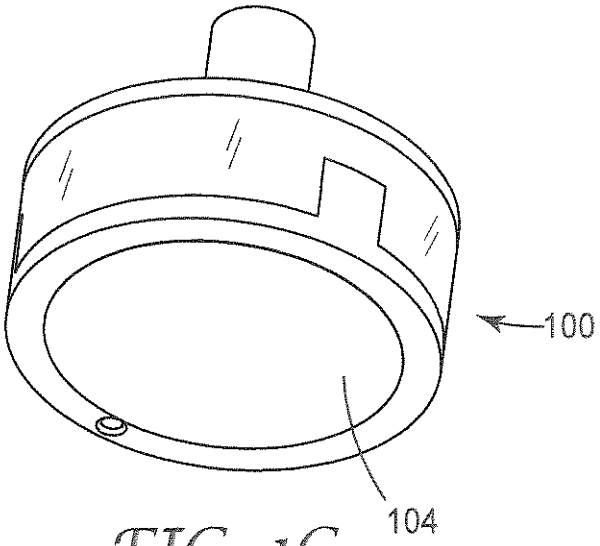


FIG. 1C

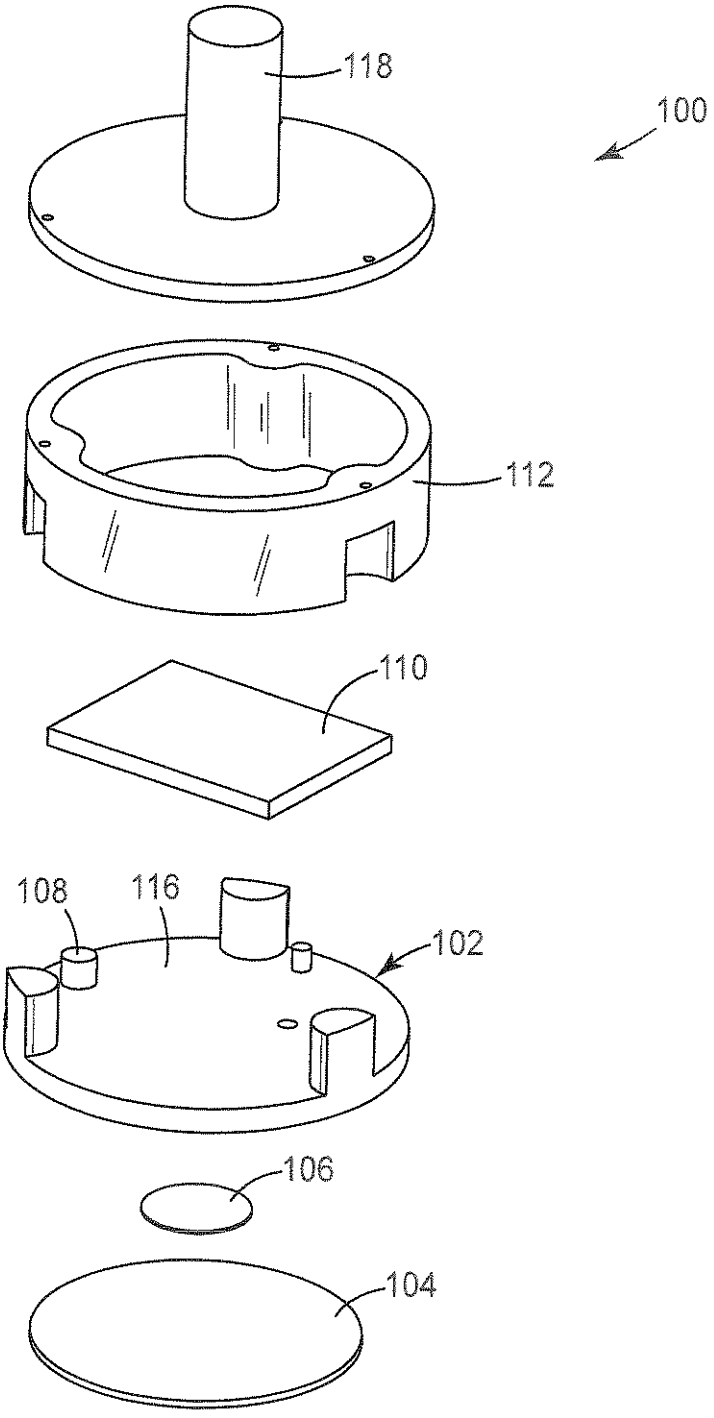


FIG. 1D

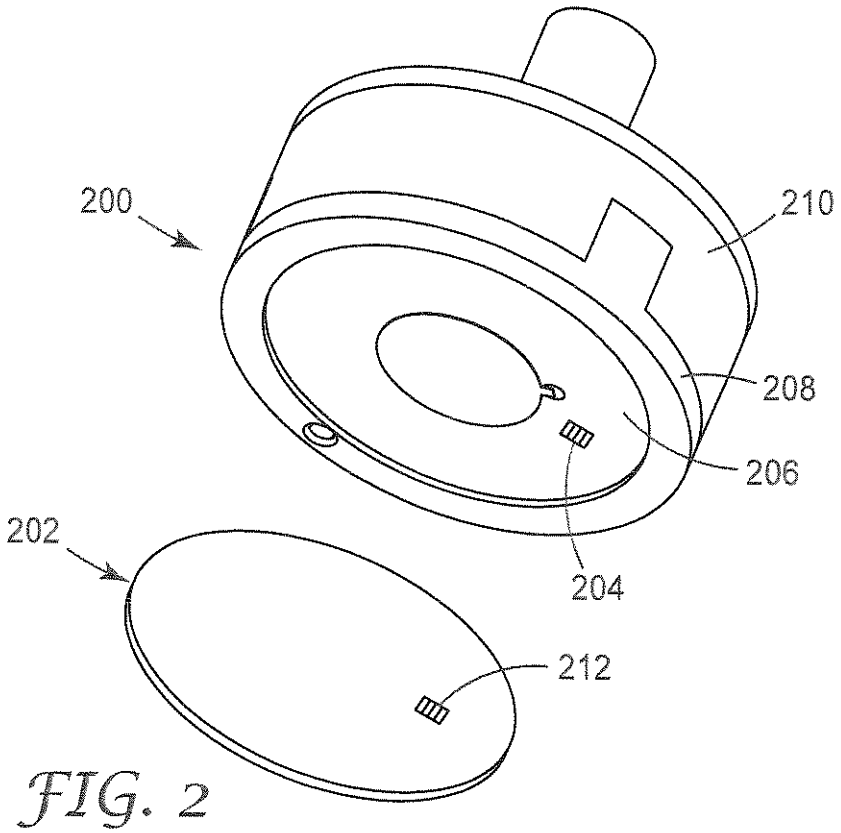


FIG. 2

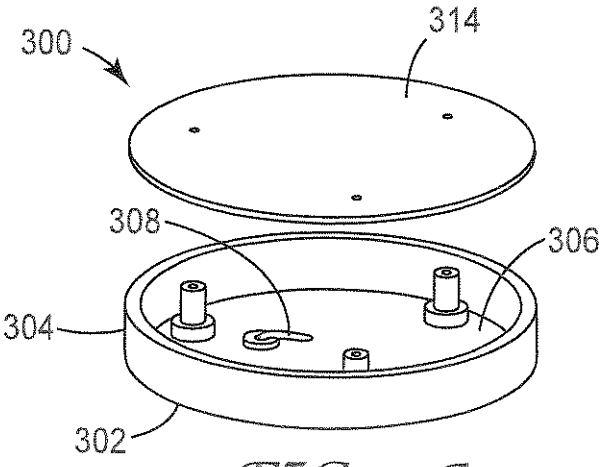


FIG. 3A

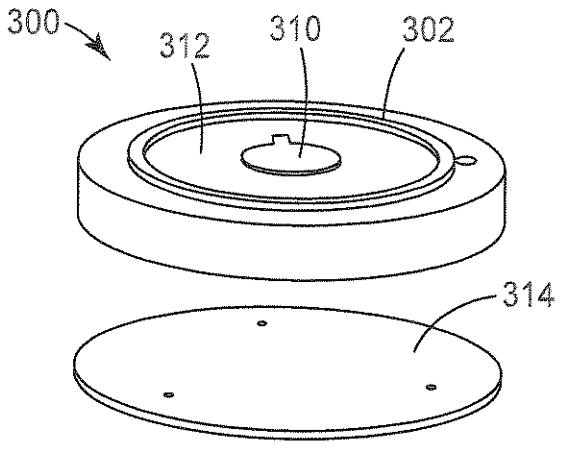


FIG. 3B

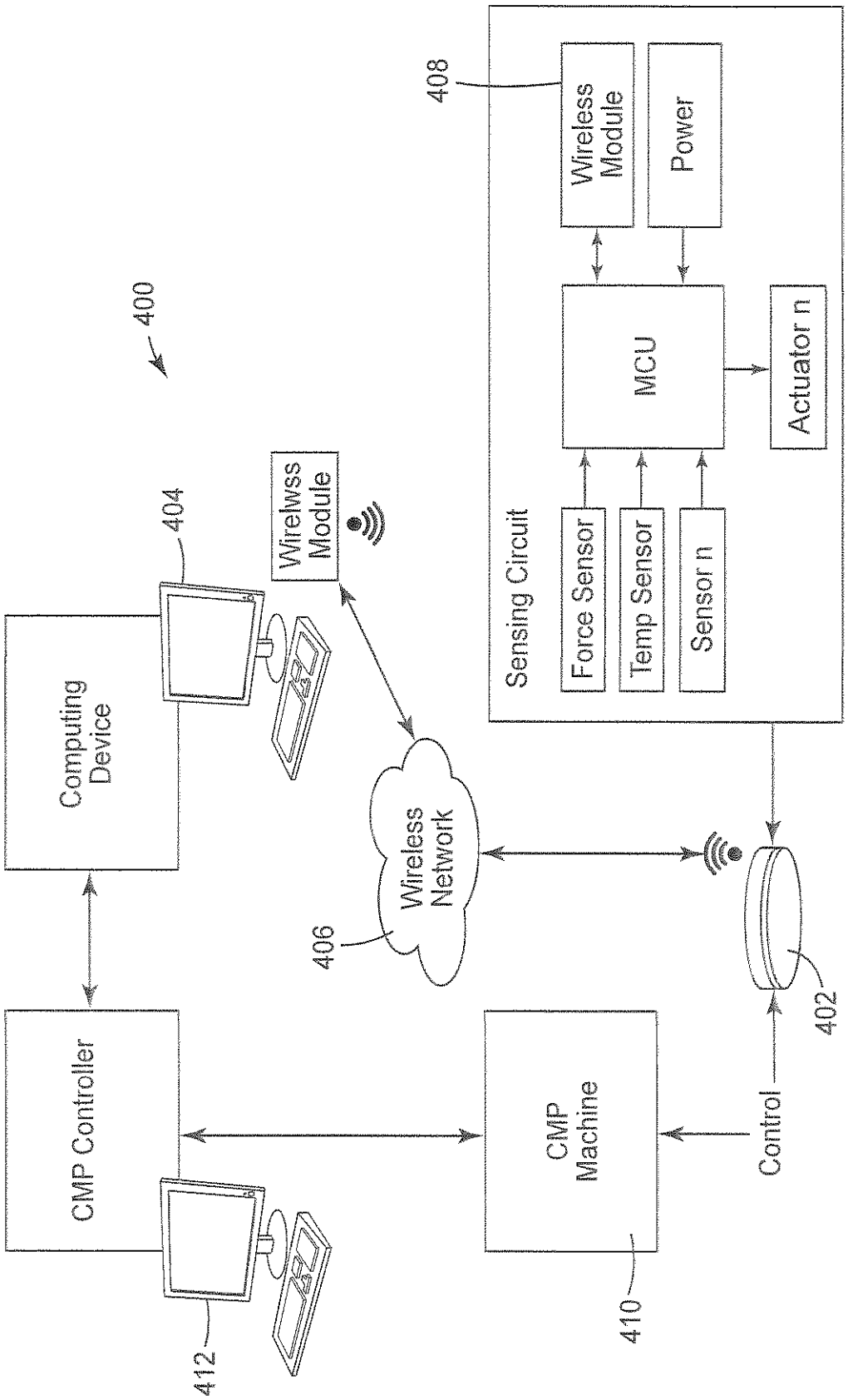

400
Computing Device
404
Wirelwss Module
Wireless Network
406
CMP Controller
412
CMP Machine
410
Control
402
408
Wireless Module
Power
MCU
Actuator n
Sensing Circuit
Force Sensor
Temp Sensor
Sensor n

FIG. 4

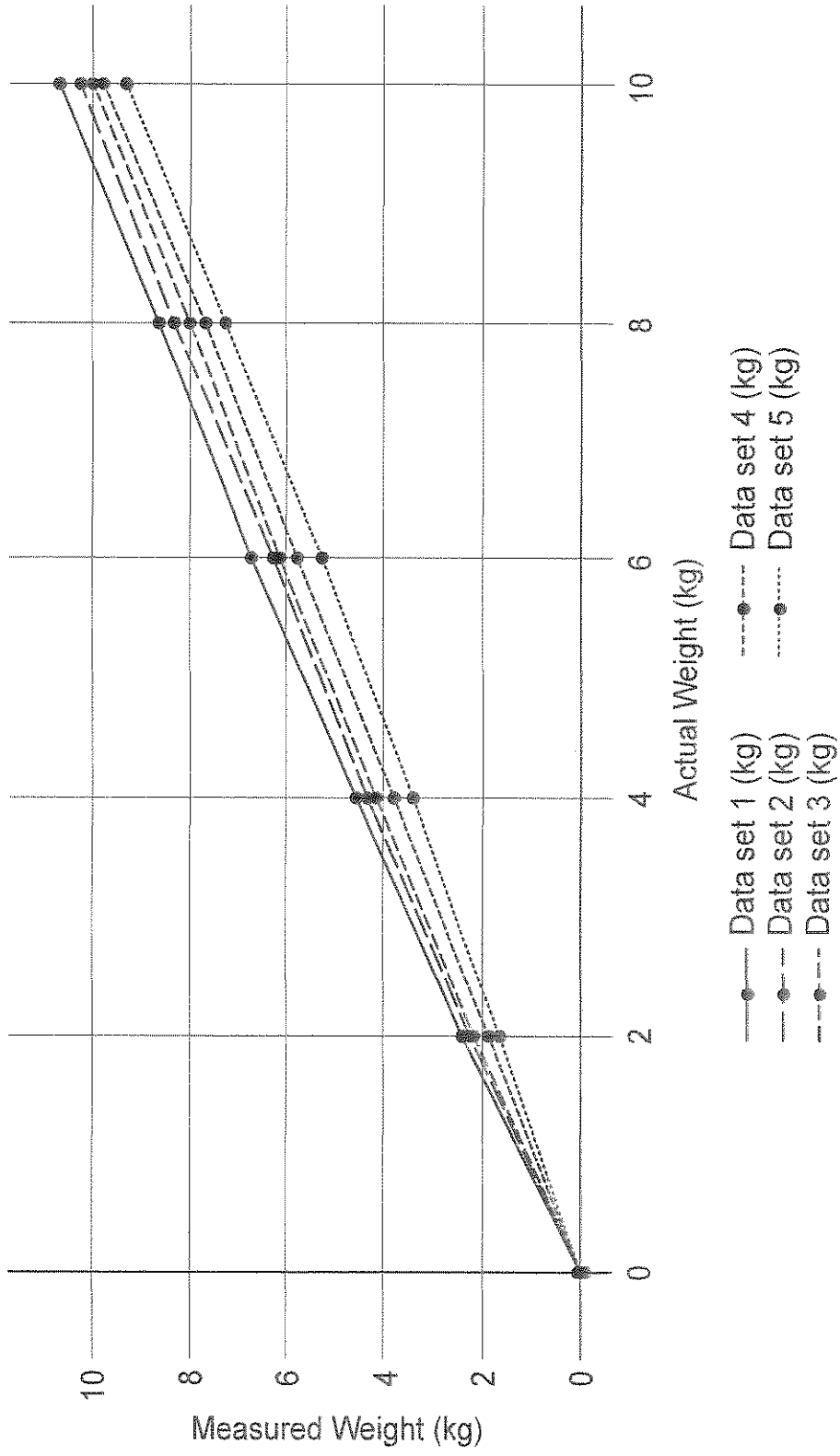

Measured Weight (kg)
0
2
4
6
8
10
Actual Weight (kg)
0
2
4
6
8
10
Data set 1 (kg)
Data set 2 (kg)
Data set 3 (kg)
Data set 4 (kg)
Data set 5 (kg)

FIG. 5

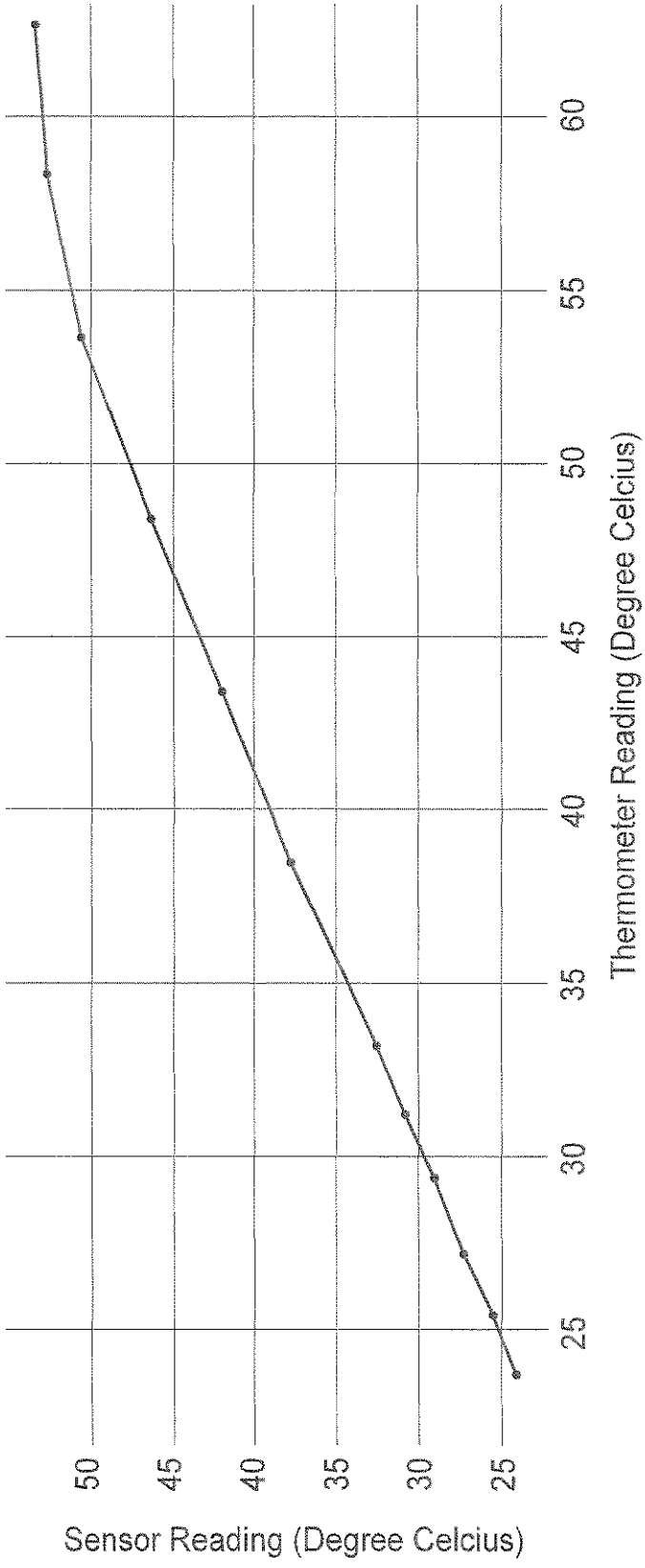

Thermometer Reading (Degree Celcius)
60
55
50
45
40
35
30
25
Sensor Reading (Degree Celcius)
50
45
40
35
30
25

FIG. 6

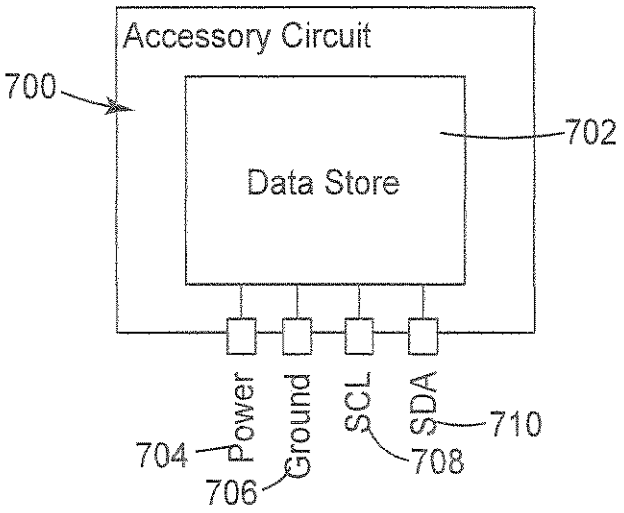

Accessory Circuit
700
Data Store
702
Power
Ground
SCL
SDA
704
706
708
710

FIG. 7A

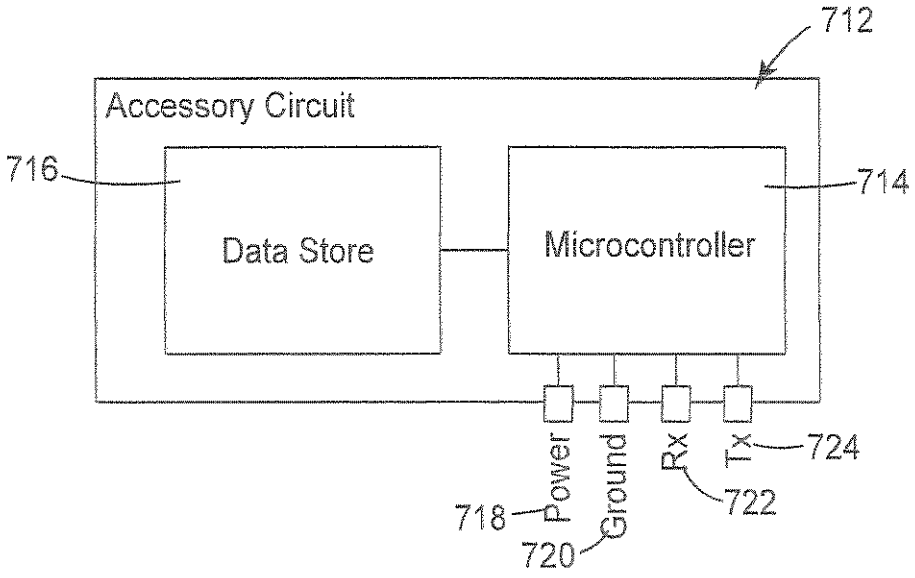

712
Accessory Circuit
716
Data Store
Microcontroller
714
Power
Ground
Rx
Tx
718
720
722
724

FIG. 7B

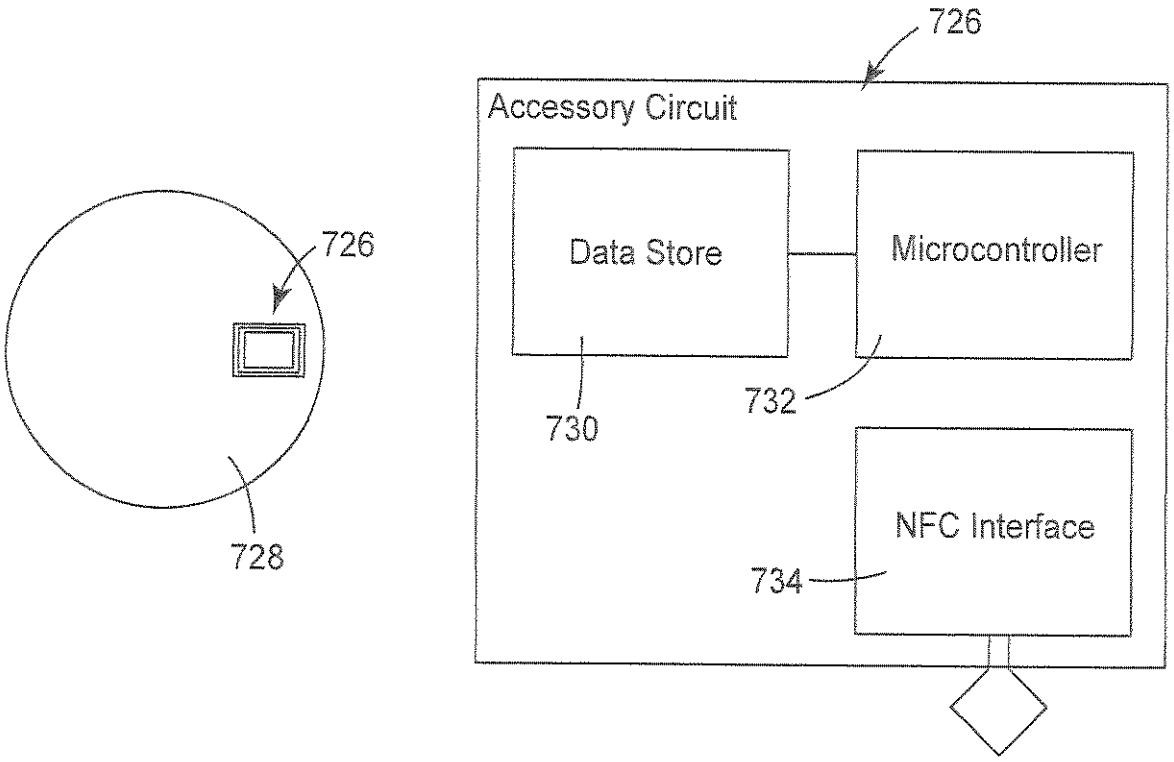

726
Accessory Circuit
Data Store
Microcontroller
730
732
NFC Interface
734
726
728

FIG. 7C

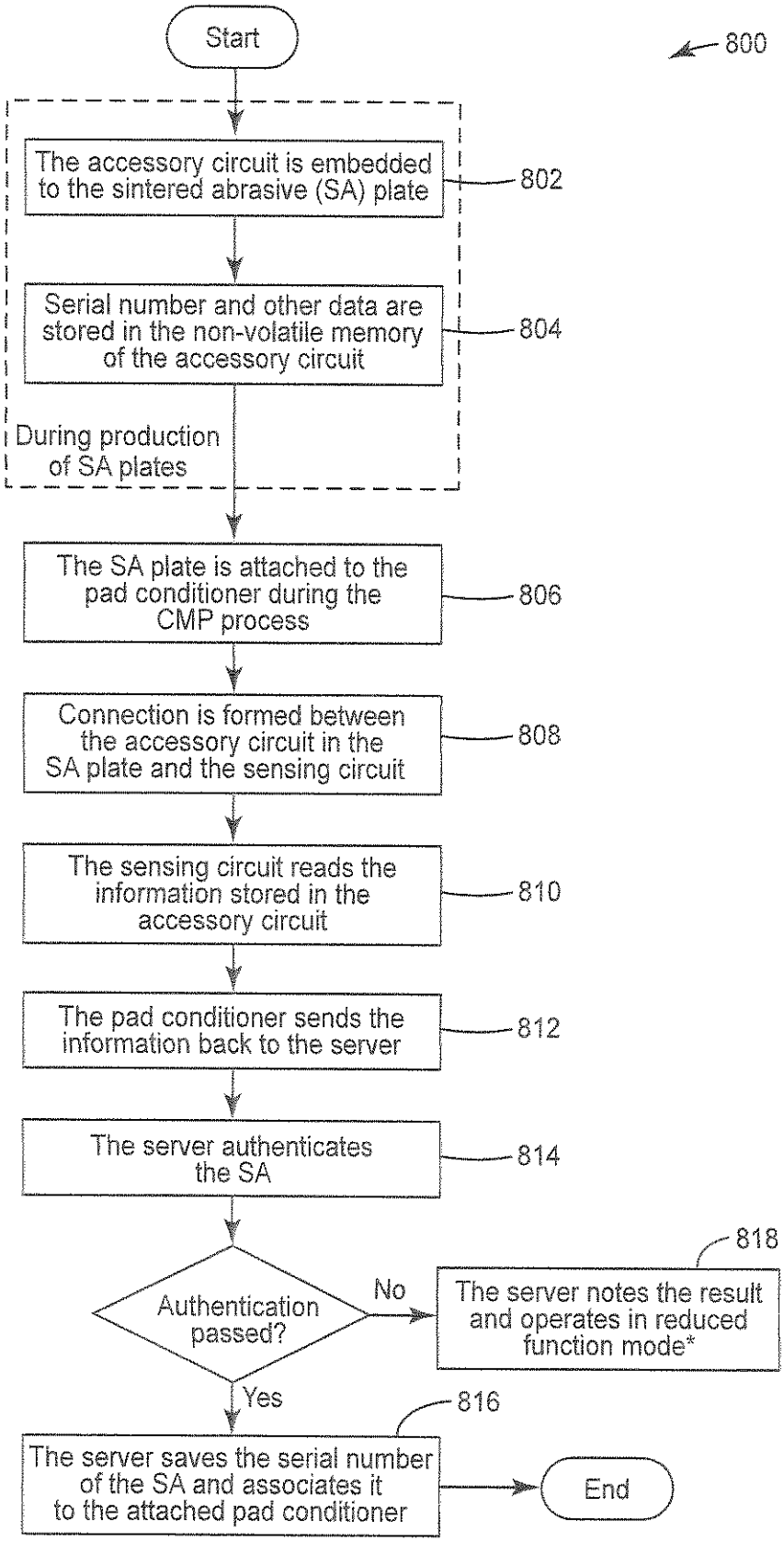

Start
800
The accessory circuit is embedded to the sintered abrasive (SA) plate
802
Serial number and other data are stored in the non-volatile memory of the accessory circuit
804
During production of SA plates
The SA plate is attached to the pad conditioner during the CMP process
806
Connection is formed between the accessory circuit in the SA plate and the sensing circuit
808
The sensing circuit reads the information stored in the accessory circuit
810
The pad conditioner sends the information back to the server
812
The server authenticates the SA
814
Authentication passed?
No
818
The server notes the result and operates in reduced function mode*
Yes
816
The server saves the serial number of the SA and associates it to the attached pad conditioner
End

FIG. 8

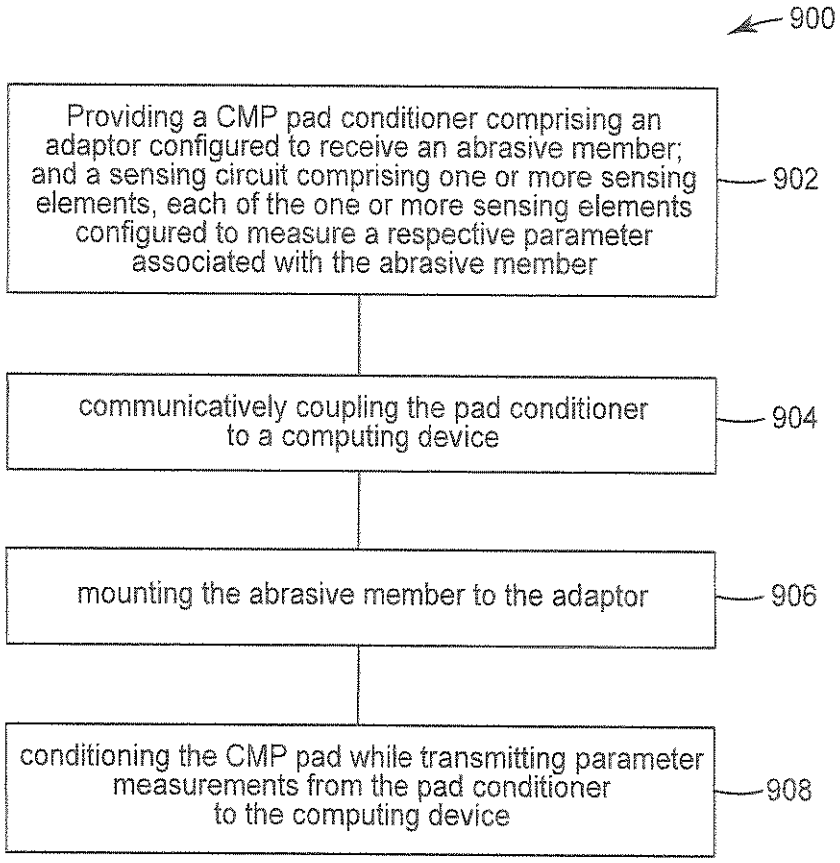

900
Providing a CMP pad conditioner comprising an adaptor configured to receive an abrasive member; and a sensing circuit comprising one or more sensing elements, each of the one or more sensing elements configured to measure a respective parameter associated with the abrasive member
902
communicatively coupling the pad conditioner to a computing device
904
mounting the abrasive member to the adaptor
906
conditioning the CMP pad while transmitting parameter measurements from the pad conditioner to the computing device
908

FIG. 9

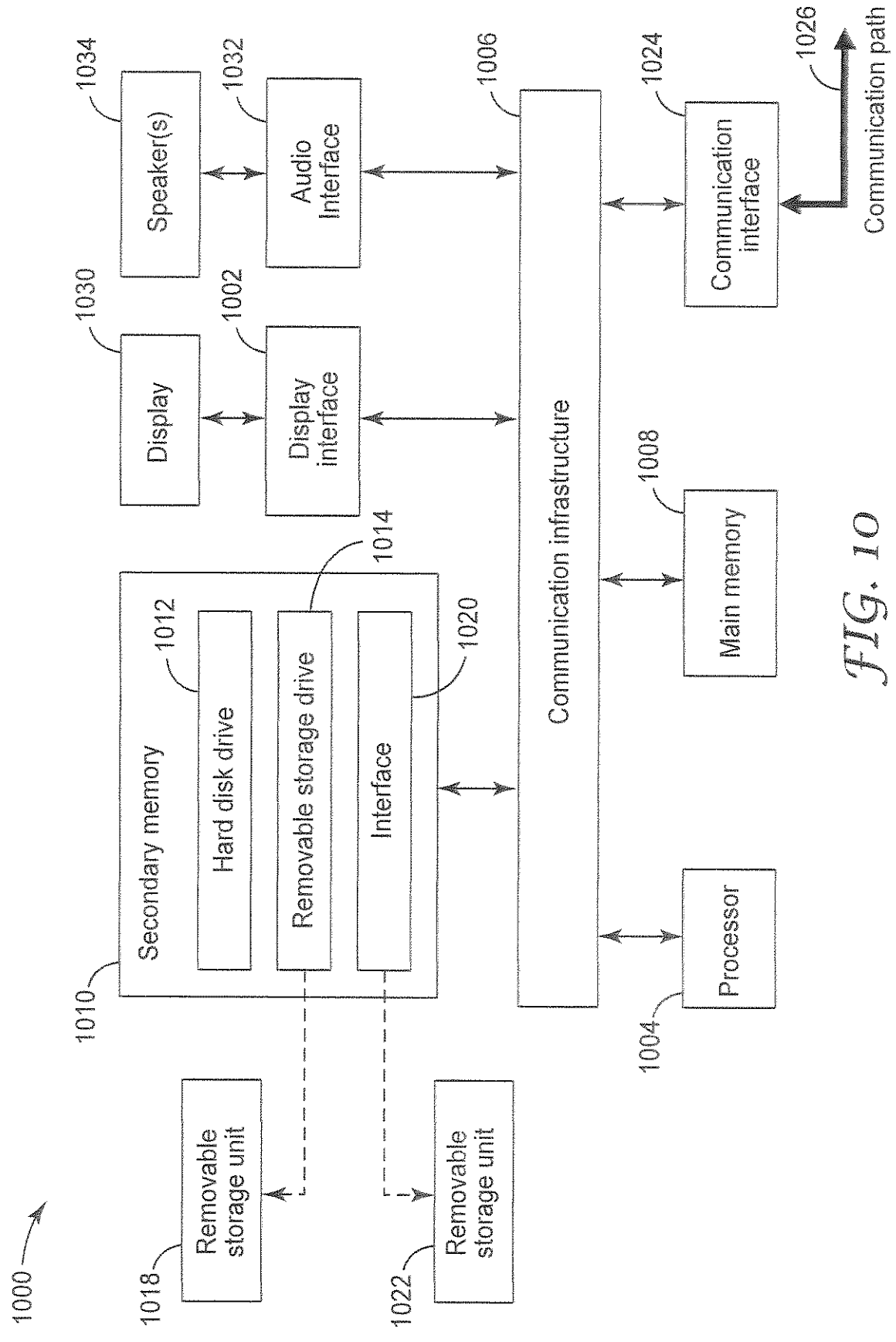

1000
1018
Removable storage unit
1022
Removable storage unit
1010
Secondary memory
1012
Hard disk drive
1014
Removable storage drive
1020
Interface
1004
Processor
1006
Communication infrastructure
1008
Main memory
1024
Communication interface
1026
Communication path
1030
Display
1002
Display interface
1032
Audio Interface
1034
Speaker(s)

FIG. 10