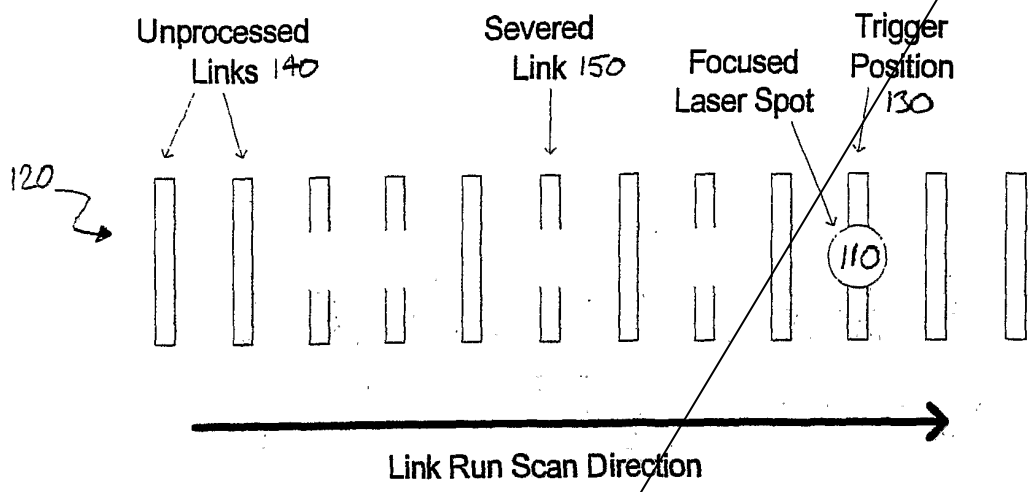


FIGURE 1

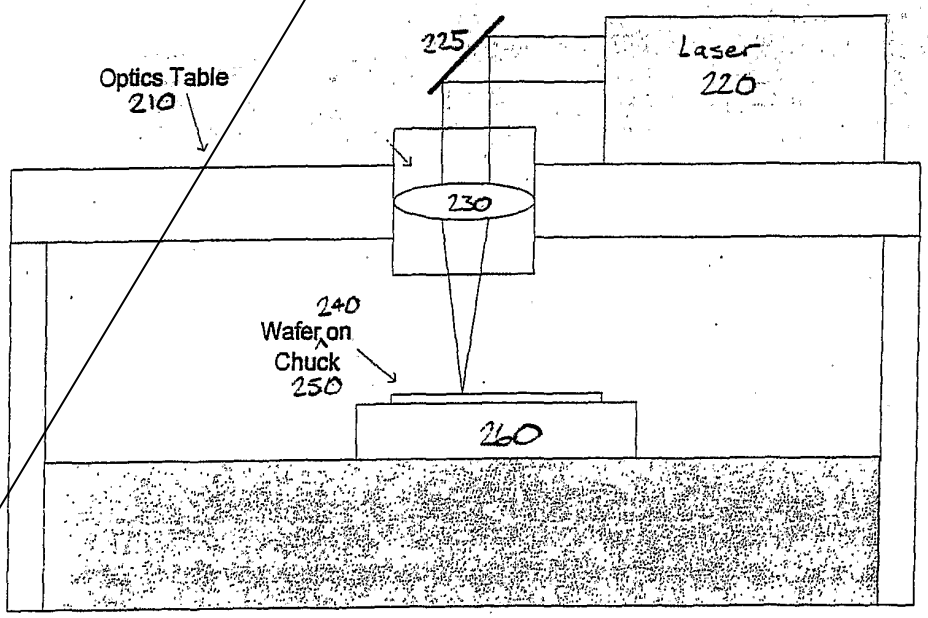


FIGURE 2

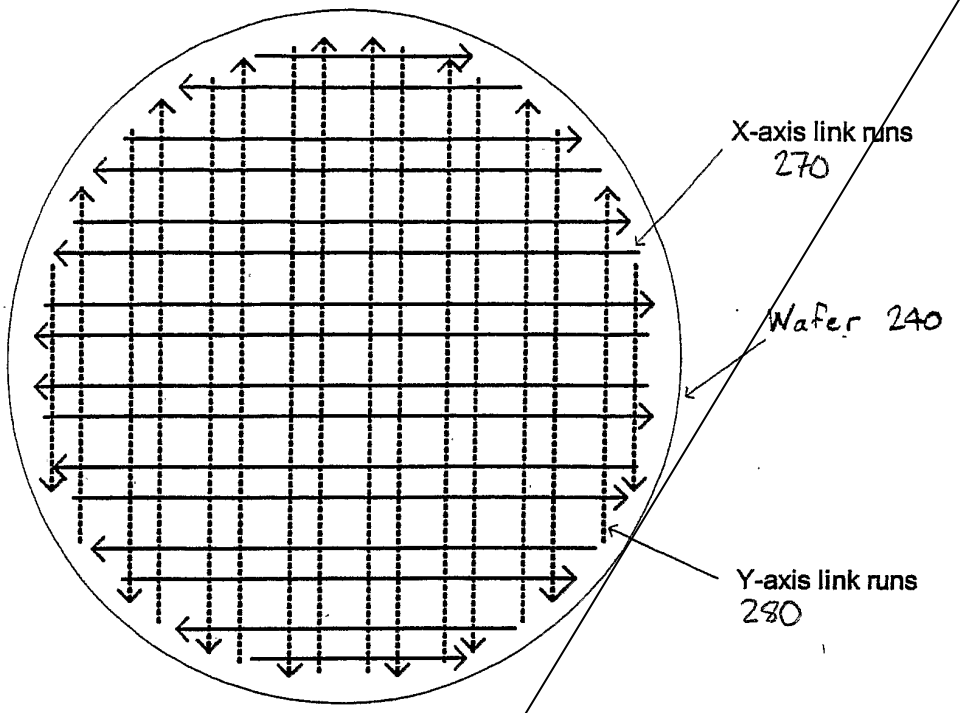


FIGURE 3

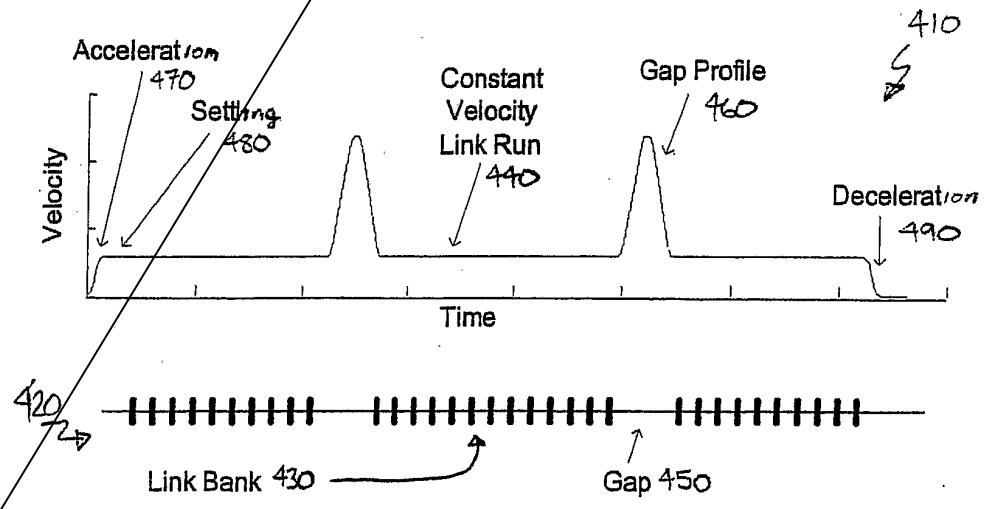


FIGURE 4

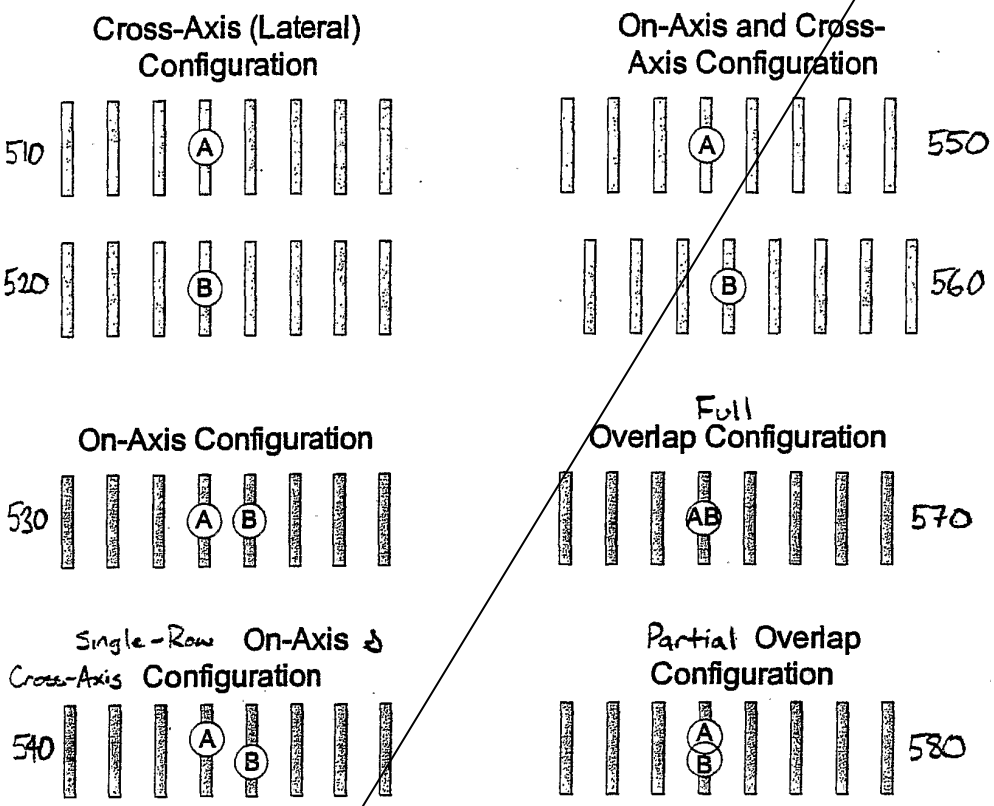


FIGURE 5

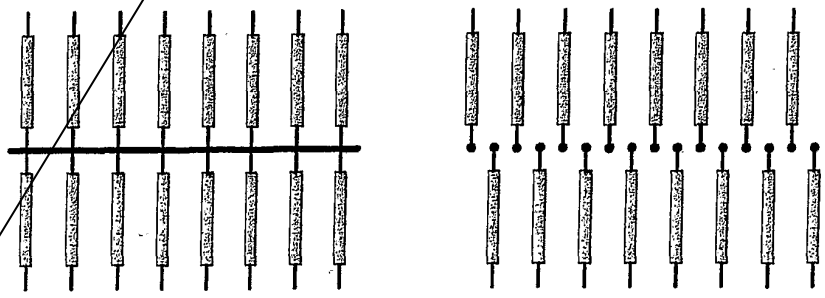


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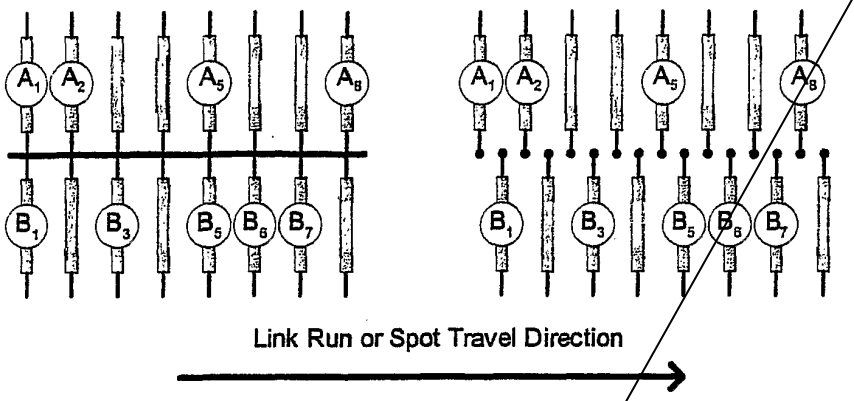


FIGURE 7

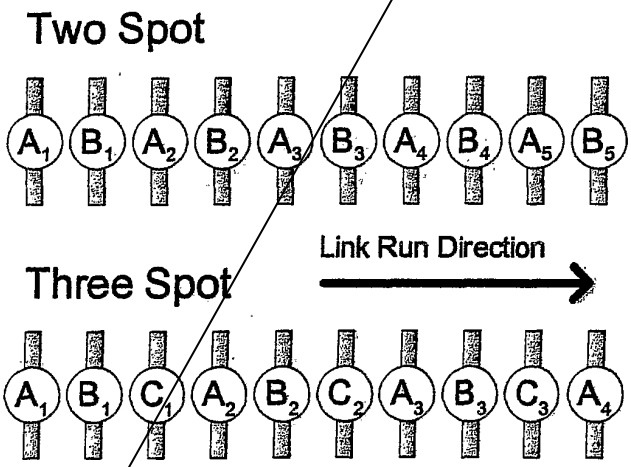


FIGURE 8

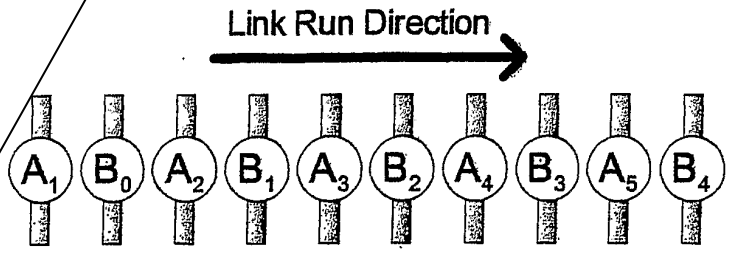


FIGURE 9

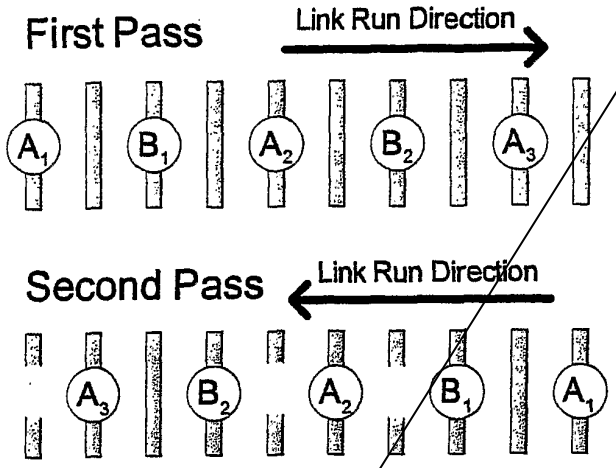


FIGURE 10

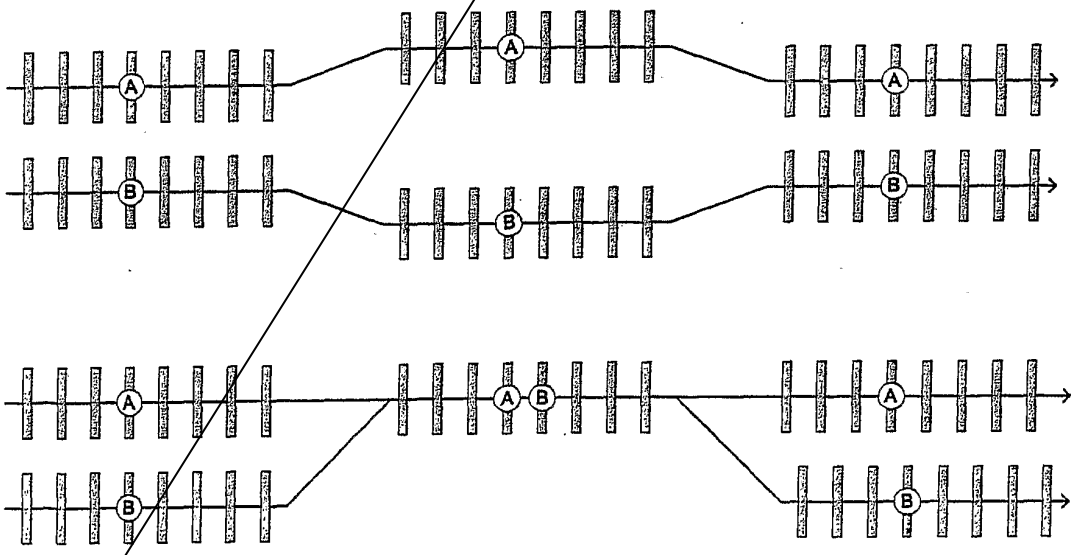


FIGURE 11

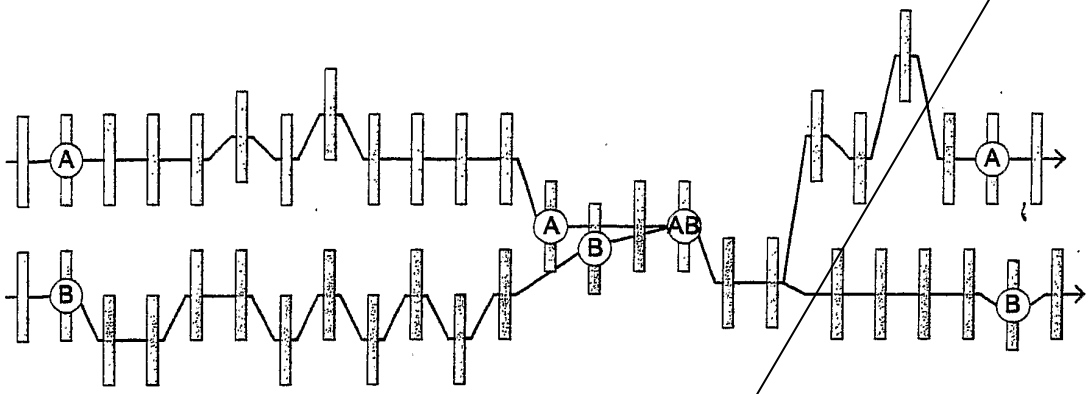


FIGURE 12

Simultaneous On-Axis and Cross-Axis Configurations

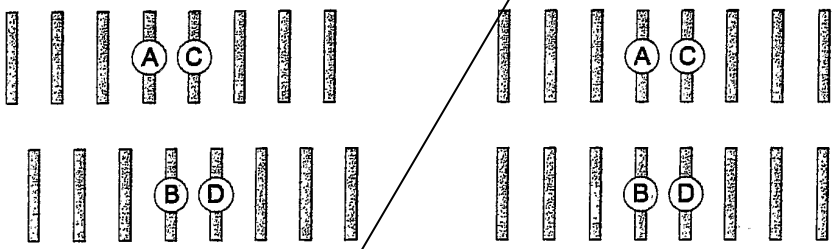


FIGURE 13

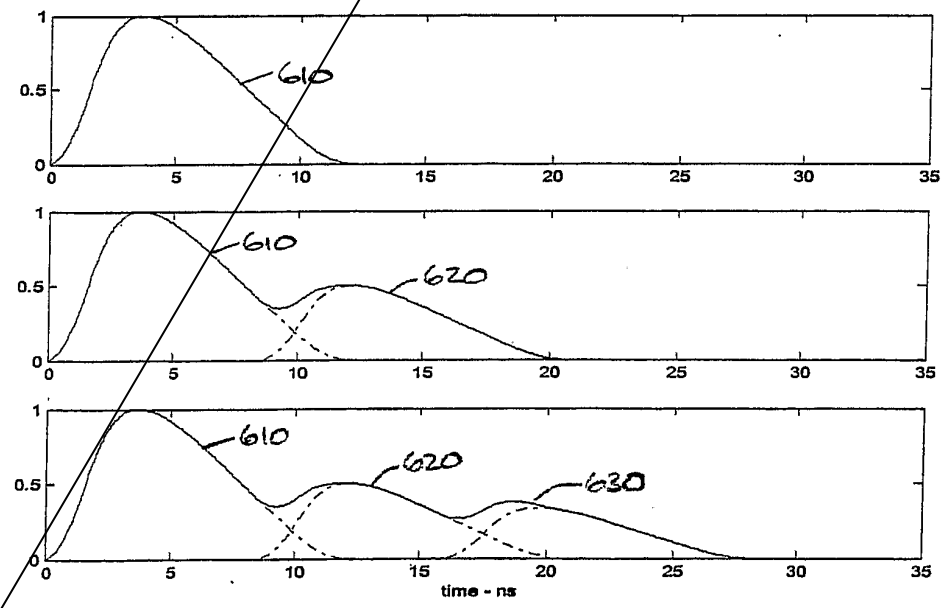


FIGURE 14

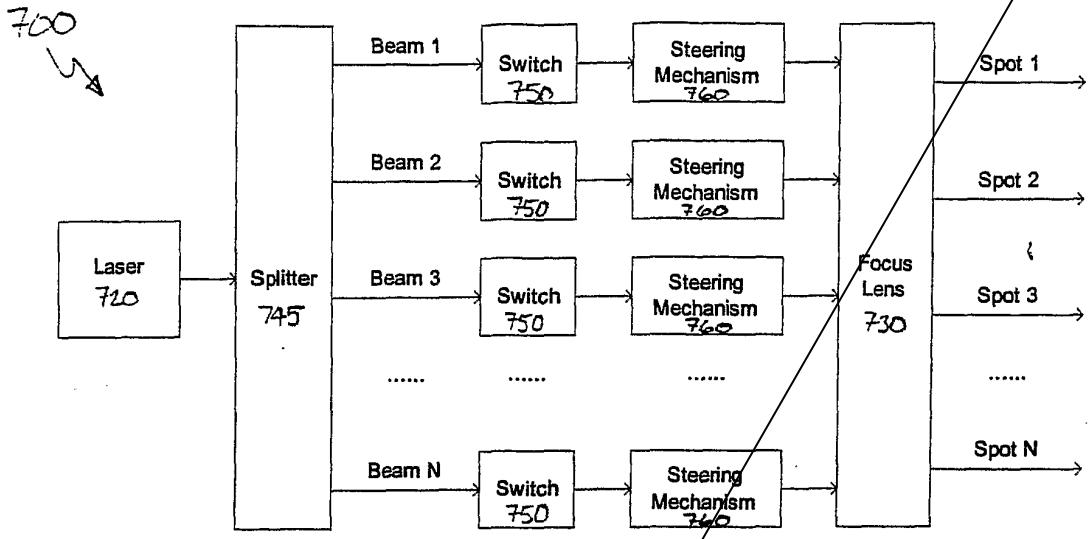


FIGURE 15

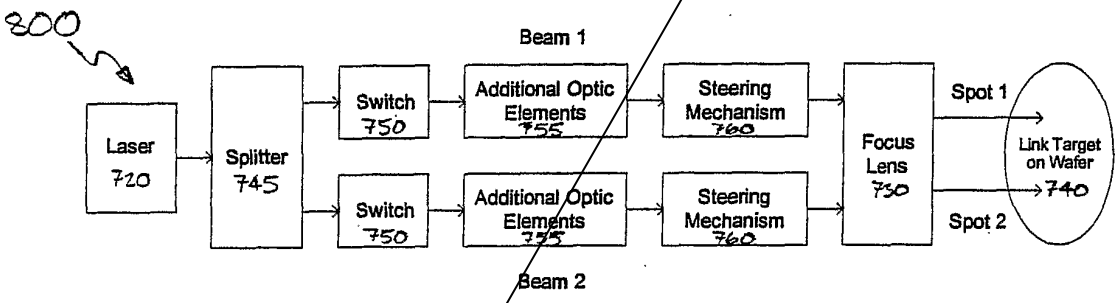


FIGURE 16

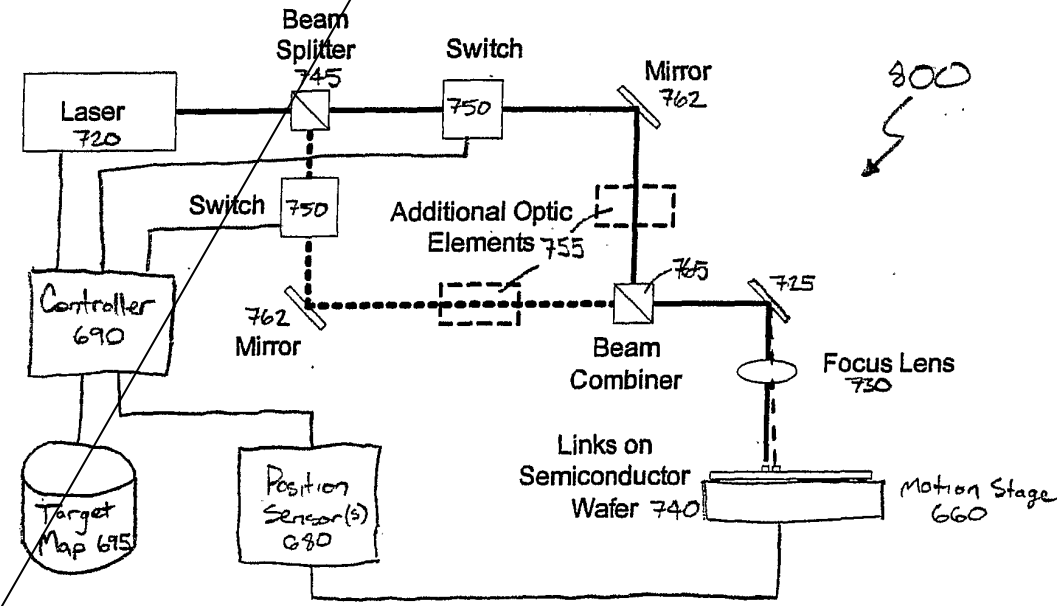


FIGURE 17

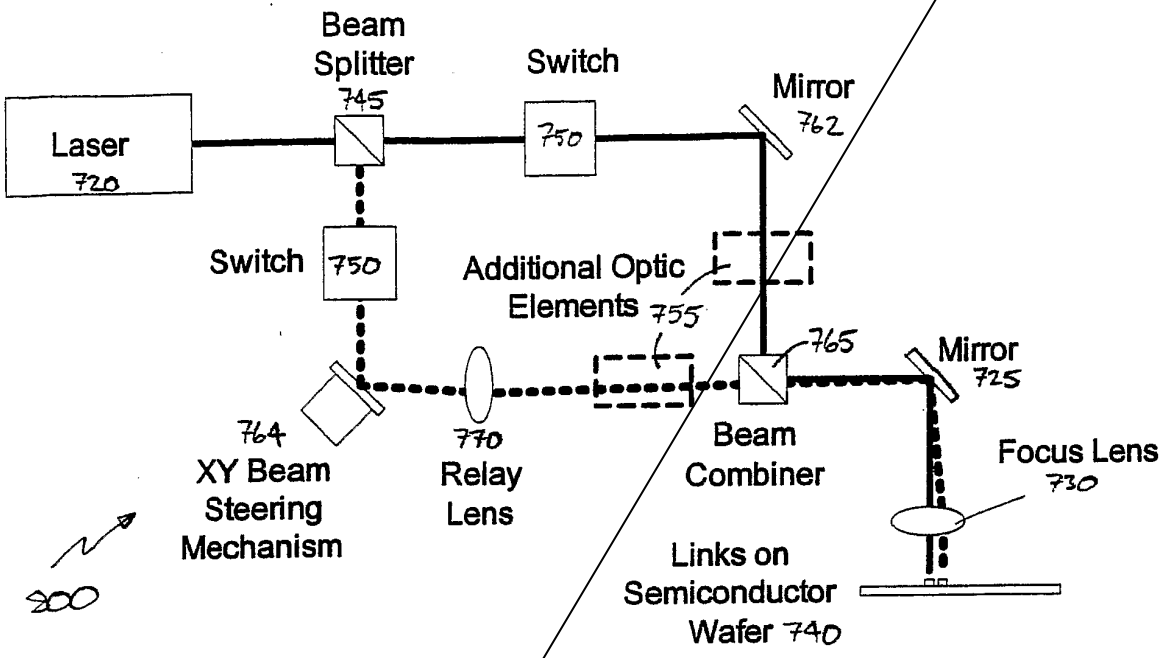


FIGURE 18

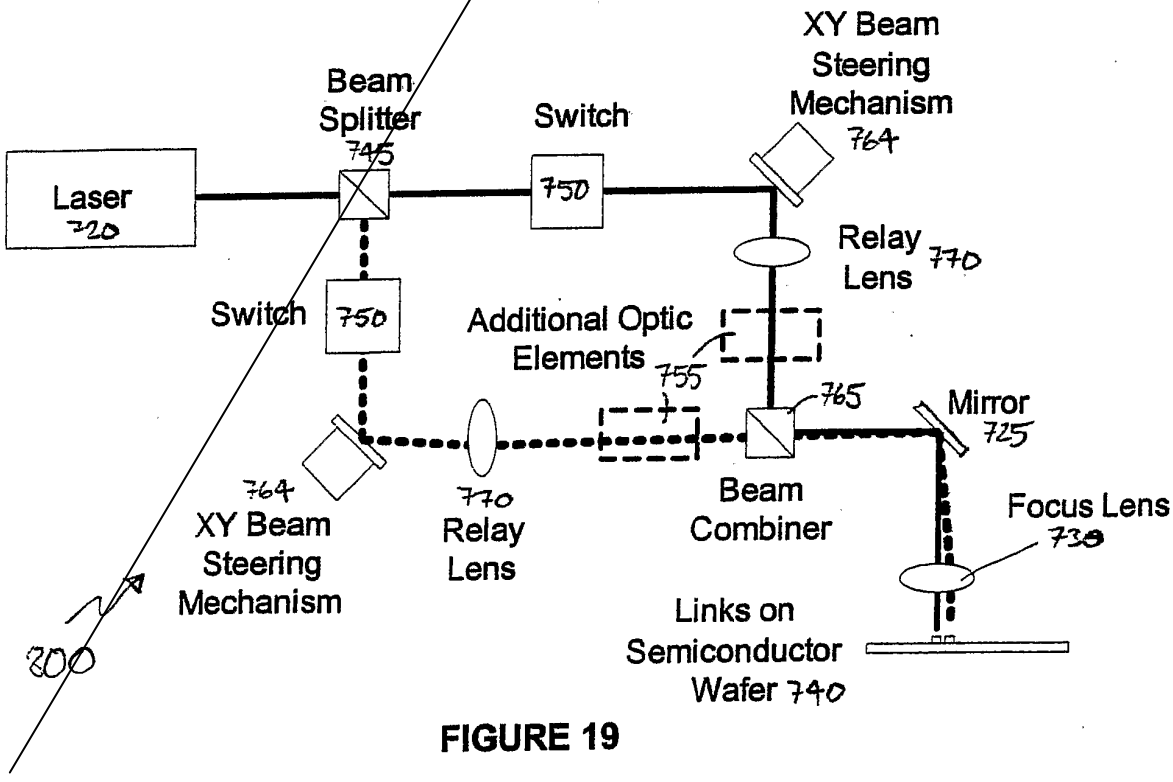


FIGURE 19

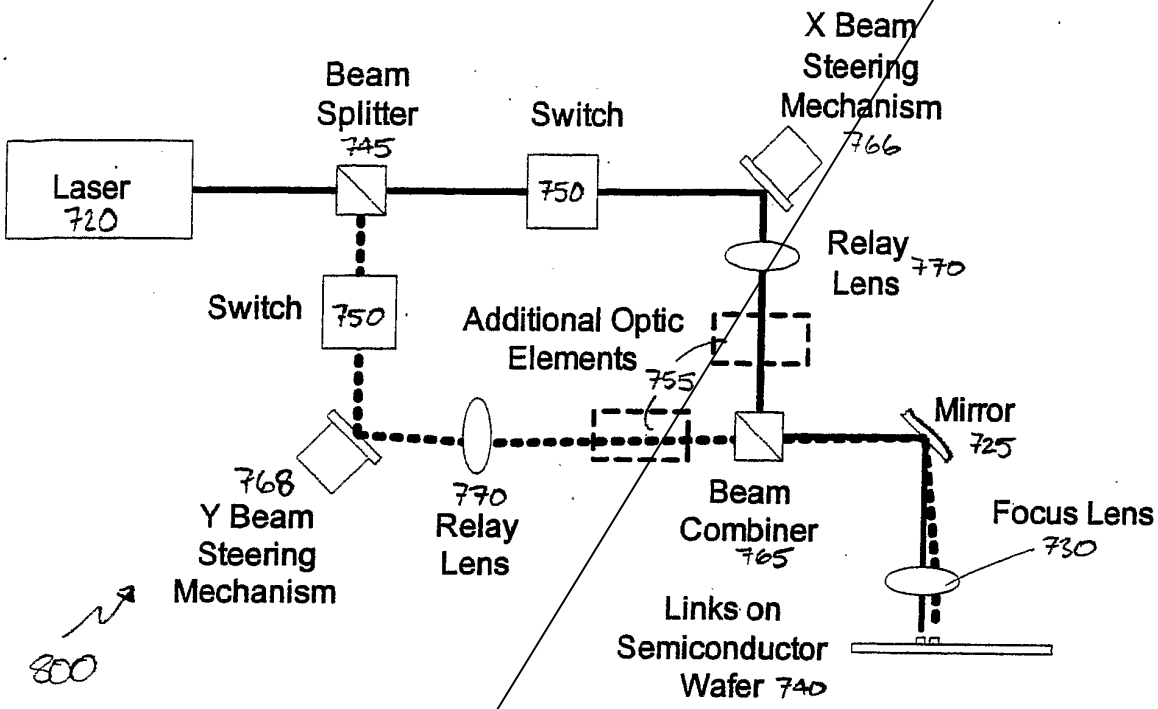


FIGURE 20

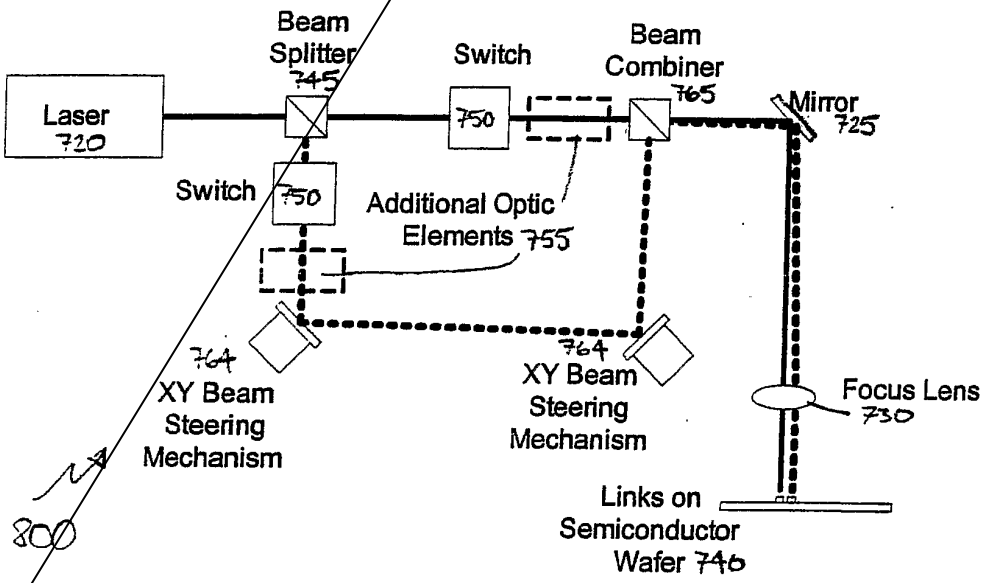


FIGURE 21

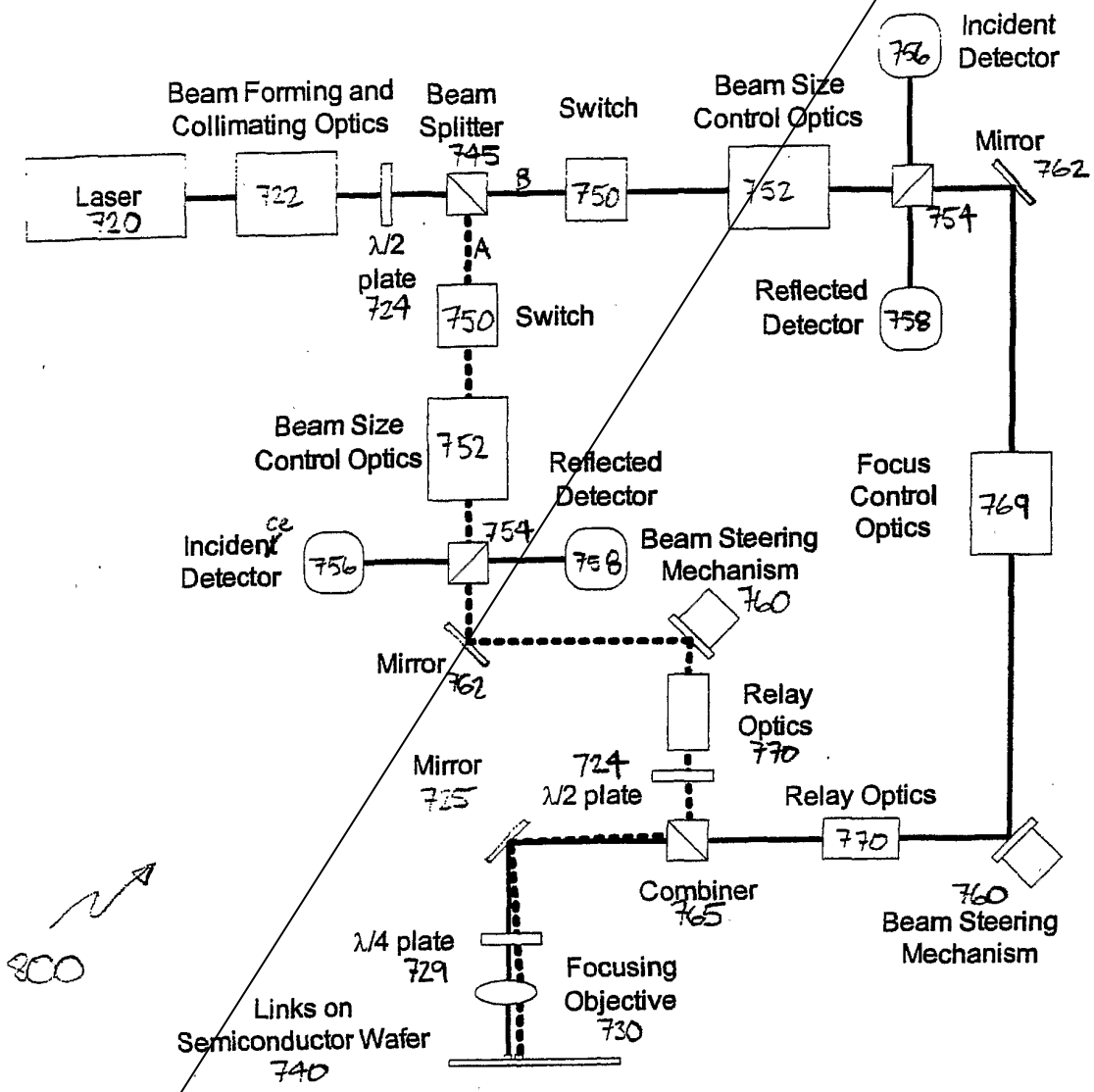

Incident Detector
756
Beam Forming and Collimating Optics
Beam Splitter
745
Switch
Beam Size Control Optics
Mirror
762
Laser
720
722
λ/2 plate
724
B
750
752
754
A
750
Switch
Reflected Detector
758
Beam Size Control Optics
752
Reflected Detector
Focus Control Optics
769
Incident Detector
756
754
758
Beam Steering Mechanism
760
Mirror
762
Relay Optics
770
Mirror
735
724
λ/2 plate
Relay Optics
770
Combiner
765
760
Beam Steering Mechanism
λ/4 plate
729
Focusing Objective
730
Links on Semiconductor Wafer
740
800

FIGURE 22

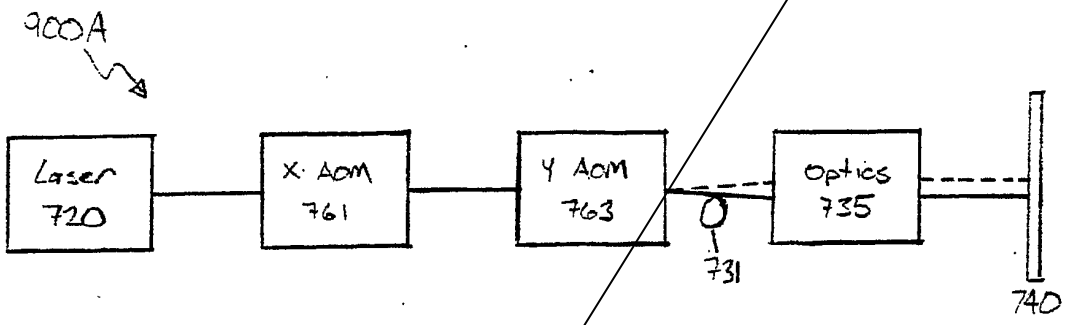


FIGURE 23

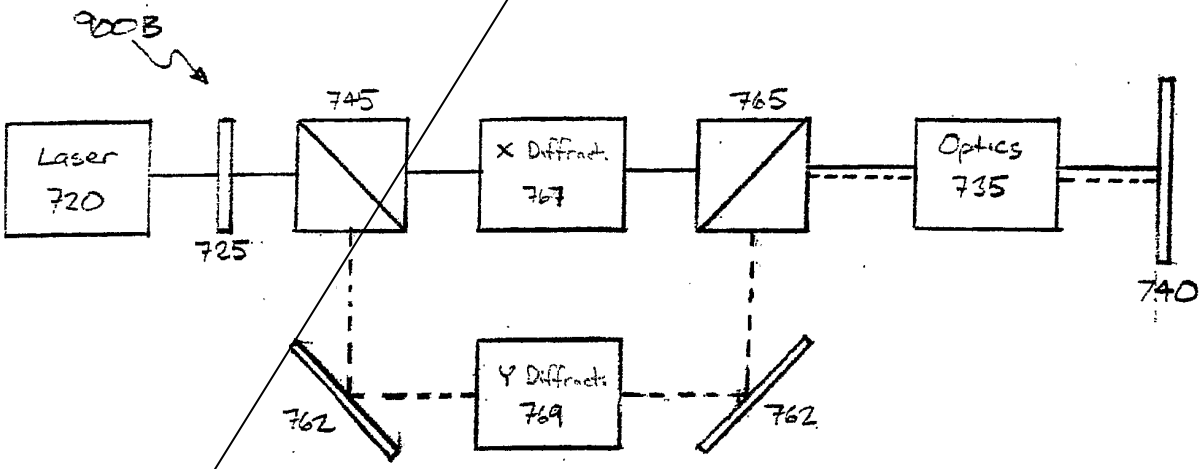


FIGURE 24

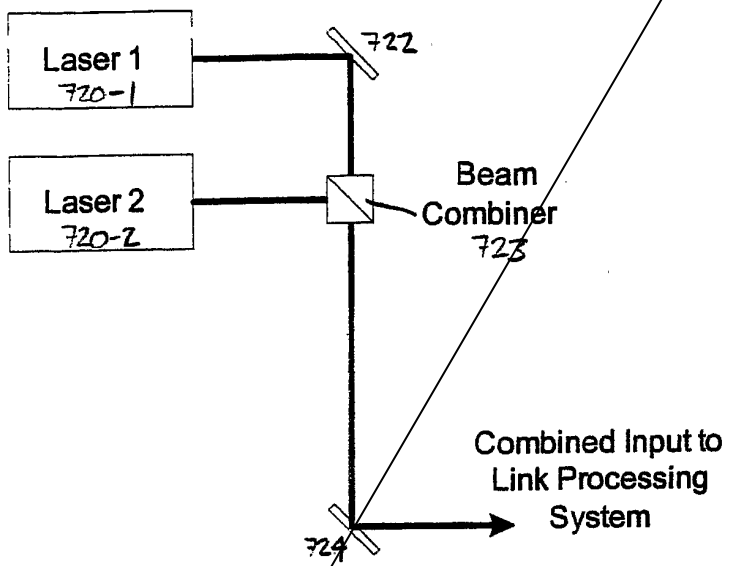


FIGURE 25

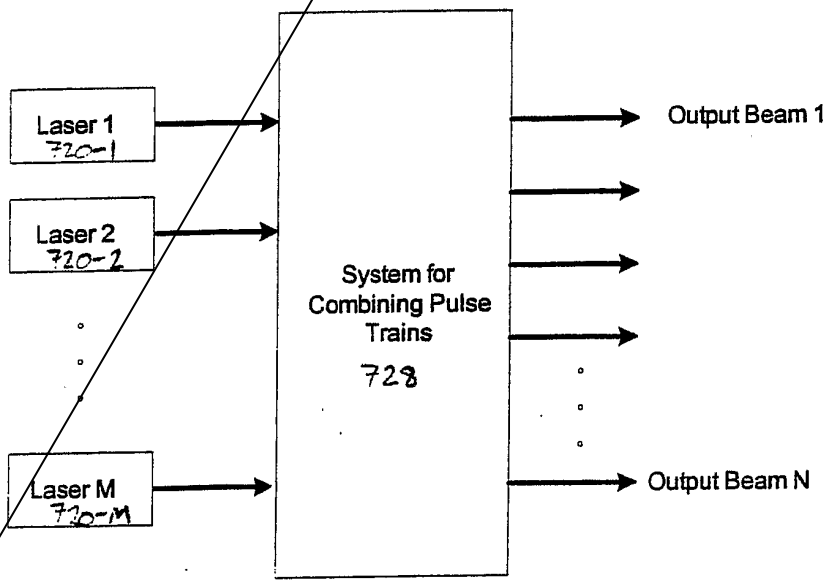


FIGURE 26

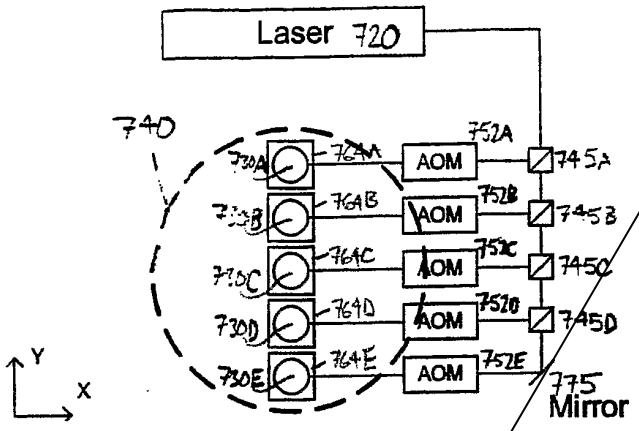


FIGURE 27

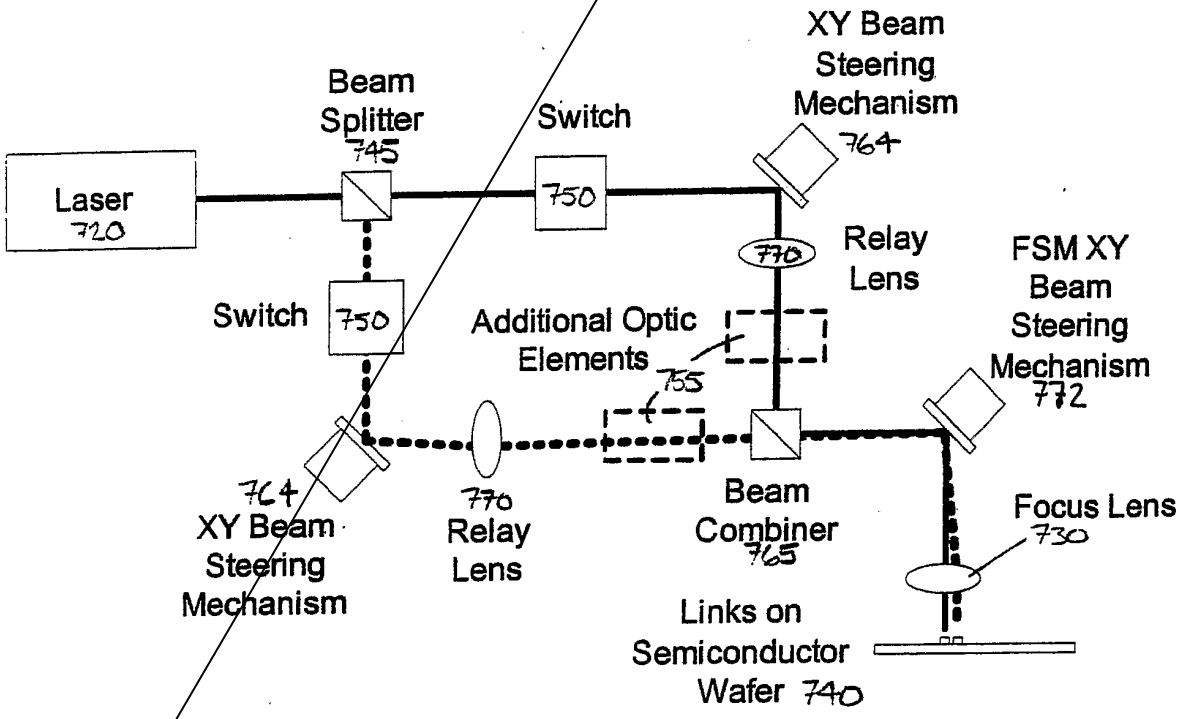


FIGURE 28

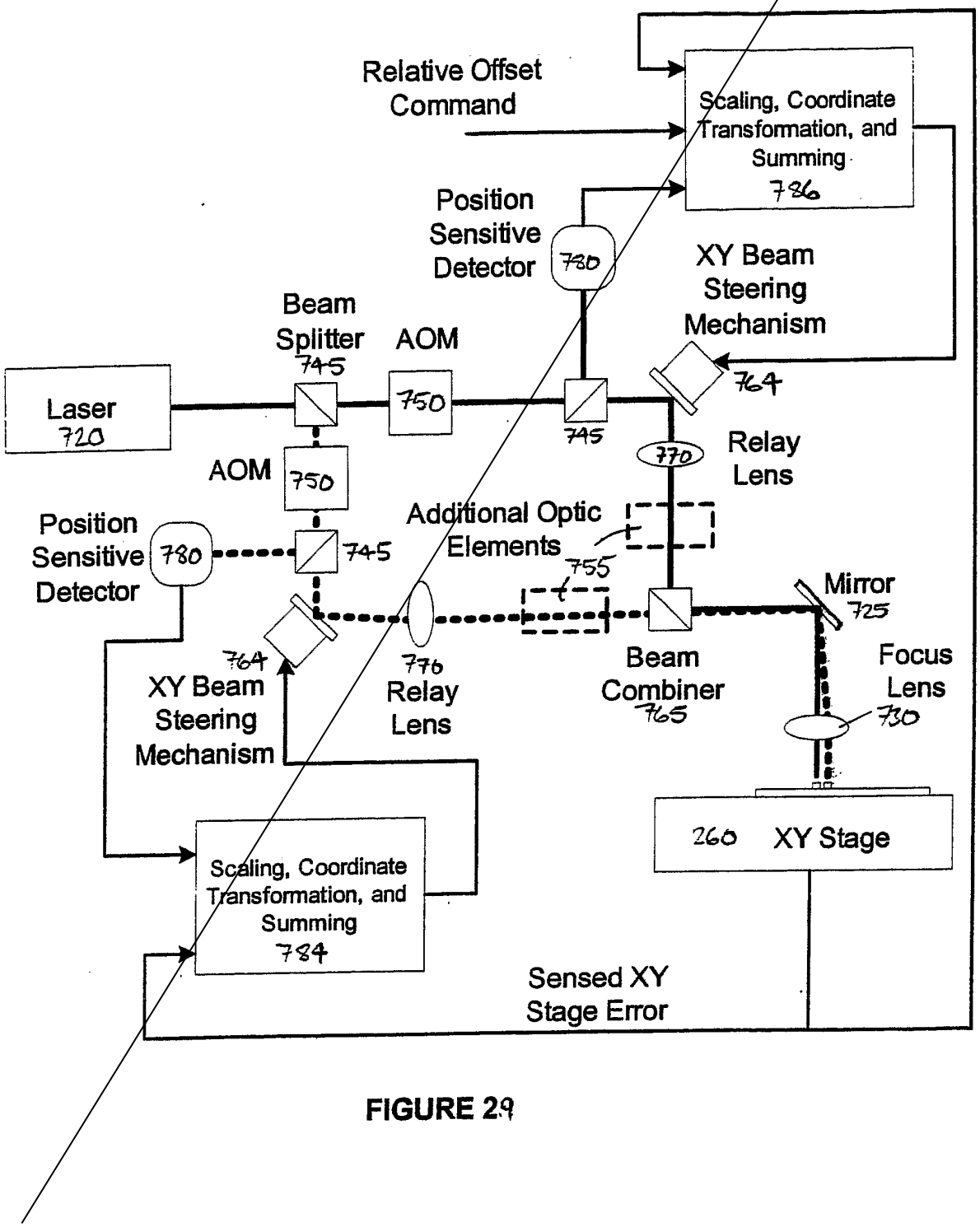

Relative Offset Command
Scaling, Coordinate Transformation, and Summing
786
Position Sensitive Detector
780
XY Beam Steering Mechanism
764
Beam Splitter
745
AOM
750
Laser
720
745
770
Relay Lens
AOM
750
Position Sensitive Detector
780
745
Additional Optic Elements
755
Mirror
725
764
XY Beam Steering Mechanism
776
Relay Lens
Beam Combiner
765
Focus Lens
730
260 XY Stage
Scaling, Coordinate Transformation, and Summing
784
Sensed XY Stage Error

FIGURE 29

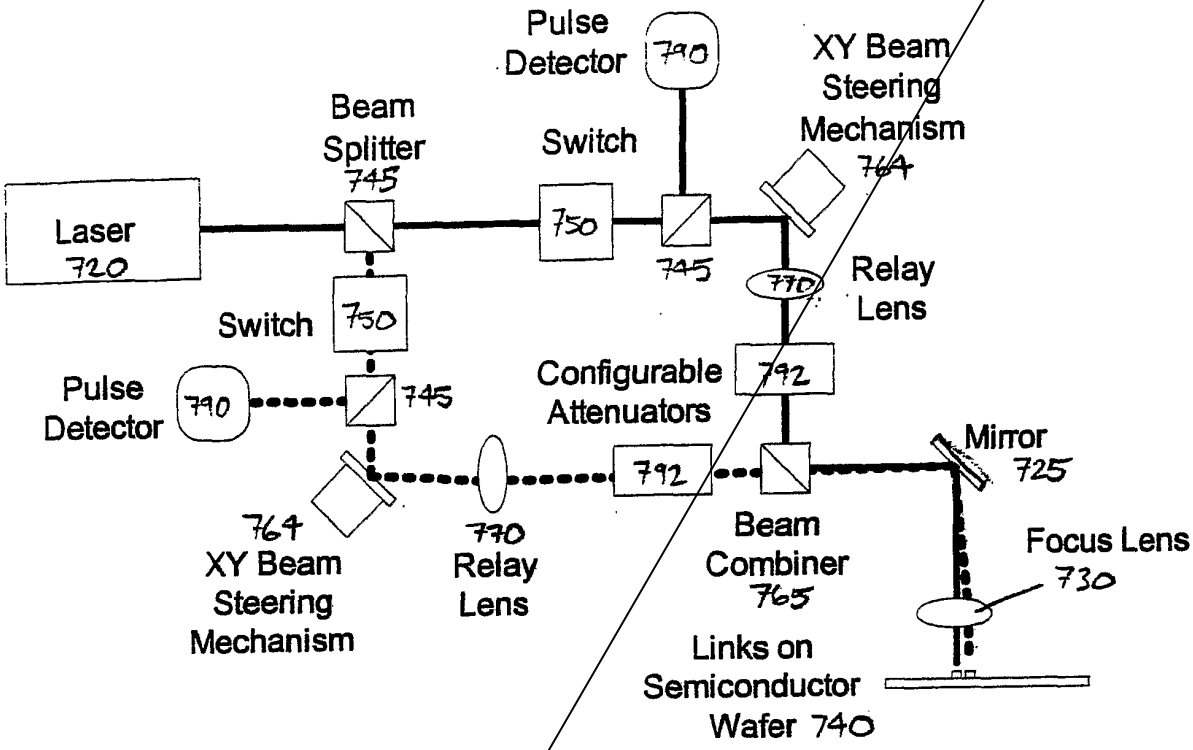


FIGURE 30

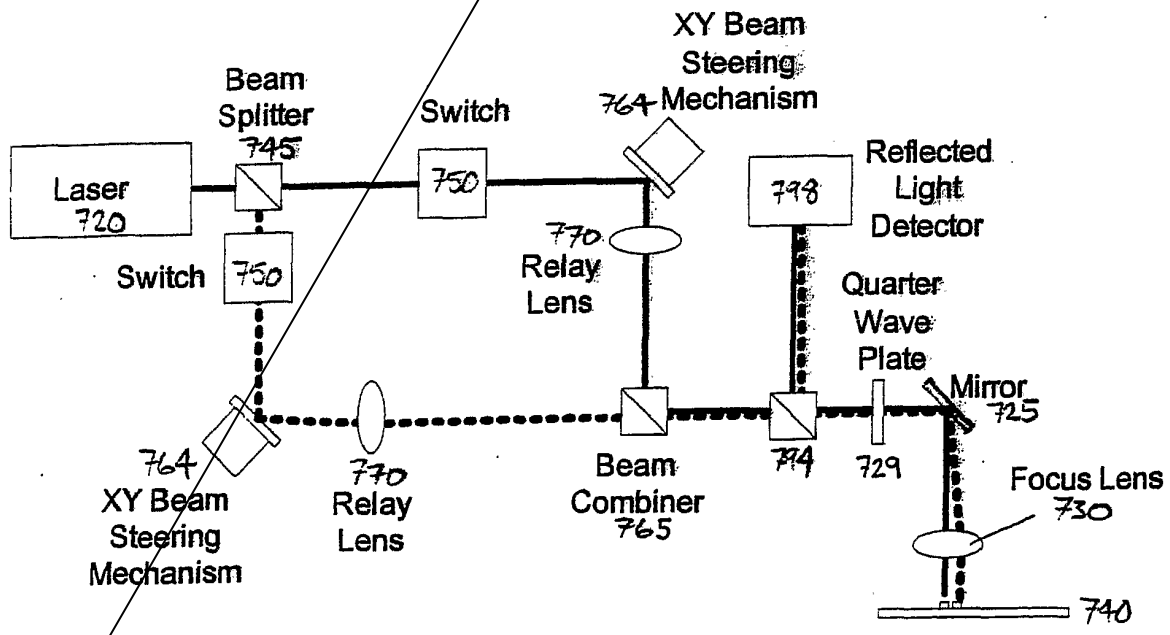


FIGURE 31

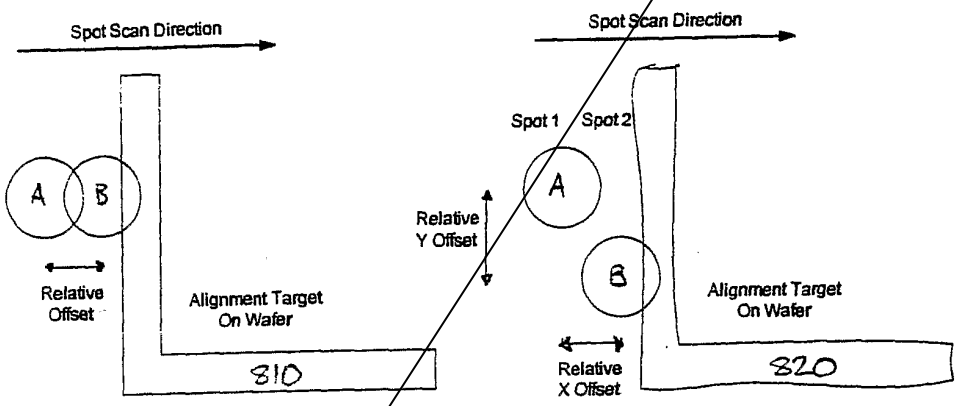

Spot Scan Direction
A
B
Relative
Offset
Alignment Target
On Wafer
310
Spot Scan Direction
Spot 1
Spot 2
A
Relative
Y Offset
B
Relative
X Offset
Alignment Target
On Wafer
320

FIGURE 32

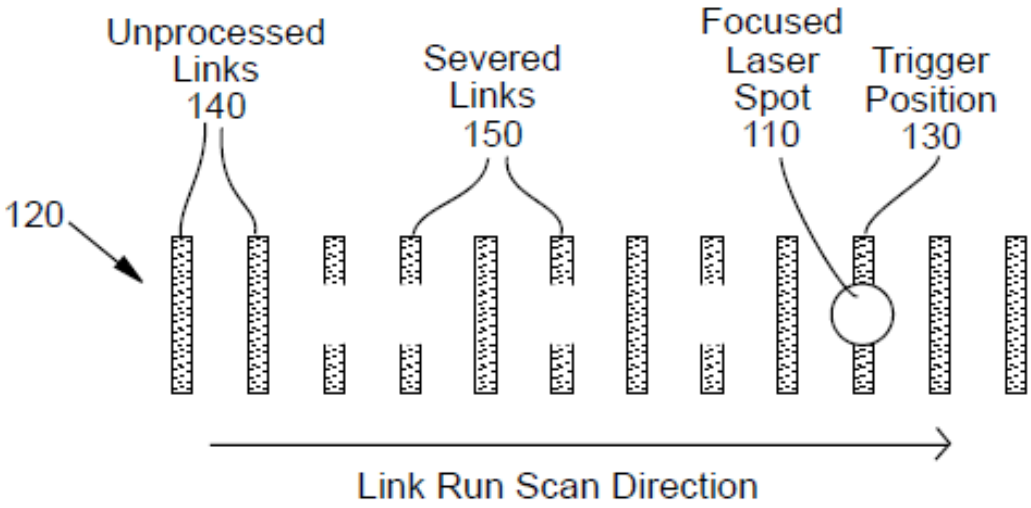

Unprocessed
Links
140
Severed
Links
150
Focused
Laser
Spot
110
Trigger
Position
130
120
Link Run Scan Direction

FIG. 1

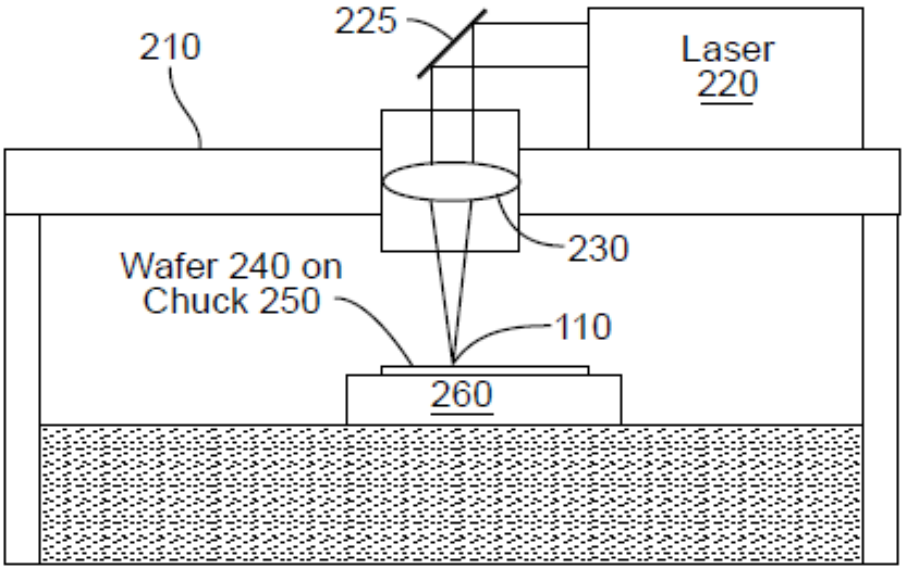

225
210
Laser
220
230
Wafer 240 on
Chuck 250
110
260

FIG. 2

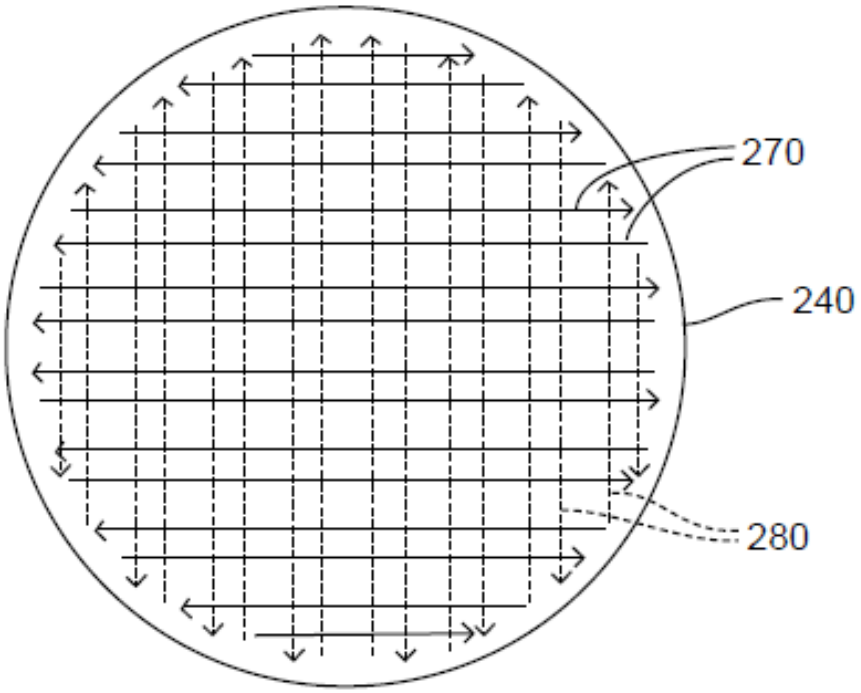


FIG. 3

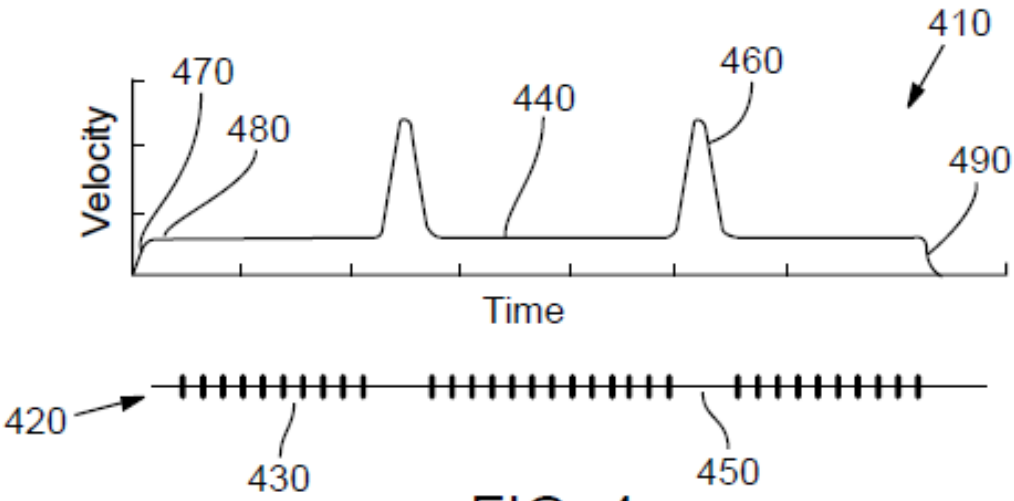


FIG. 4

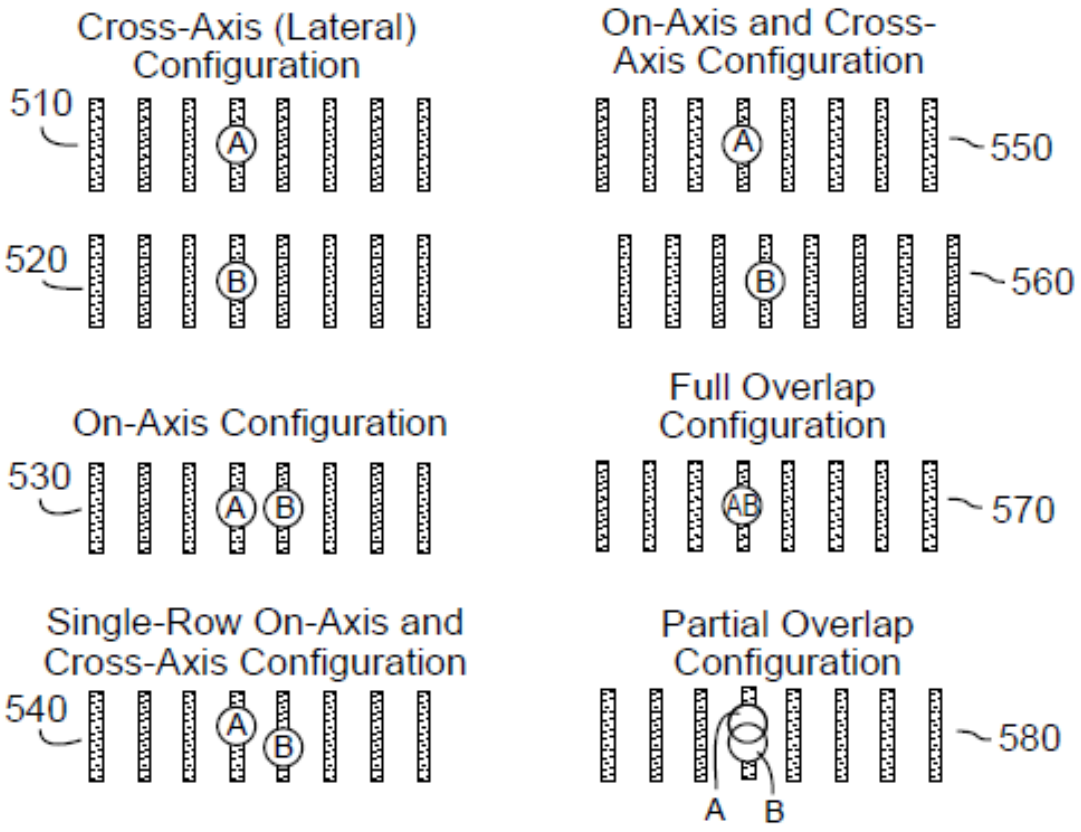

Cross-Axis (Lateral) Configuration
510
A
520
B
On-Axis and Cross-Axis Configuration
A
550
B
560
On-Axis Configuration
530
A
B
Full Overlap Configuration
AB
570
Single-Row On-Axis and Cross-Axis Configuration
540
A
B
Partial Overlap Configuration
580
A
B

FIG. 5

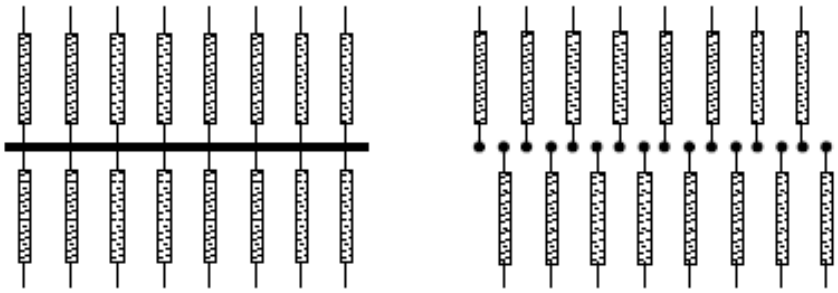


FIG. 6

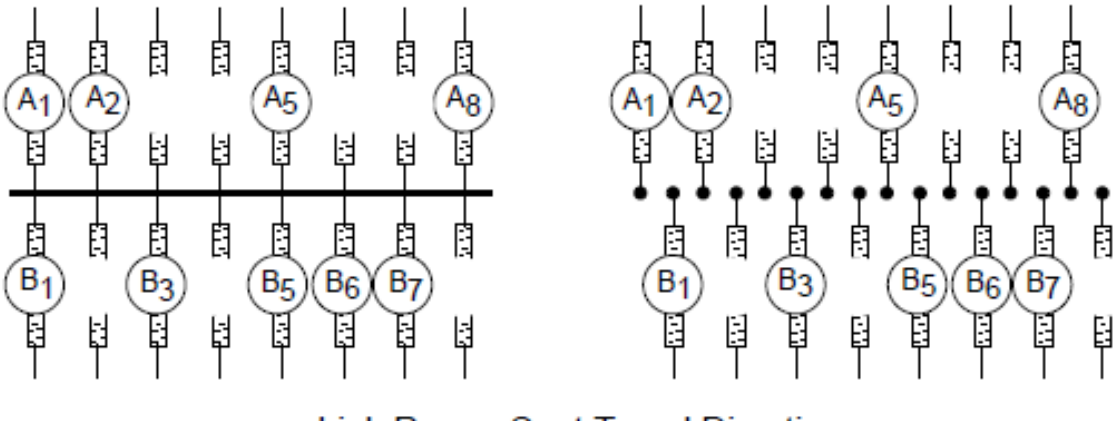


FIG. 7

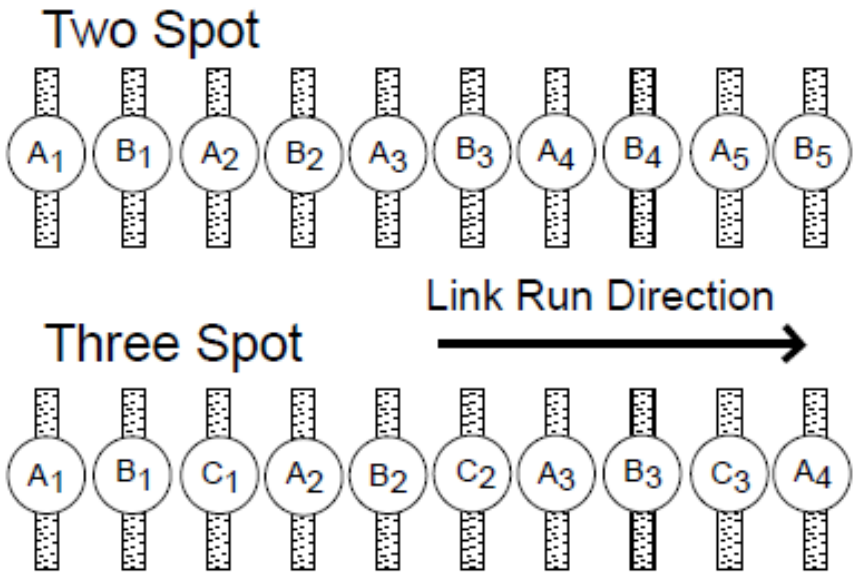


FIG. 8

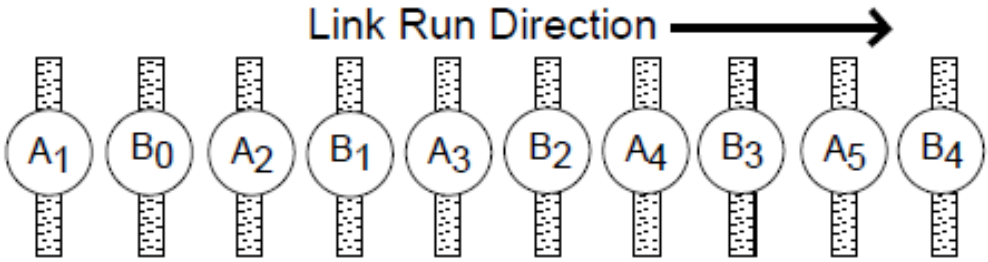


FIG. 9

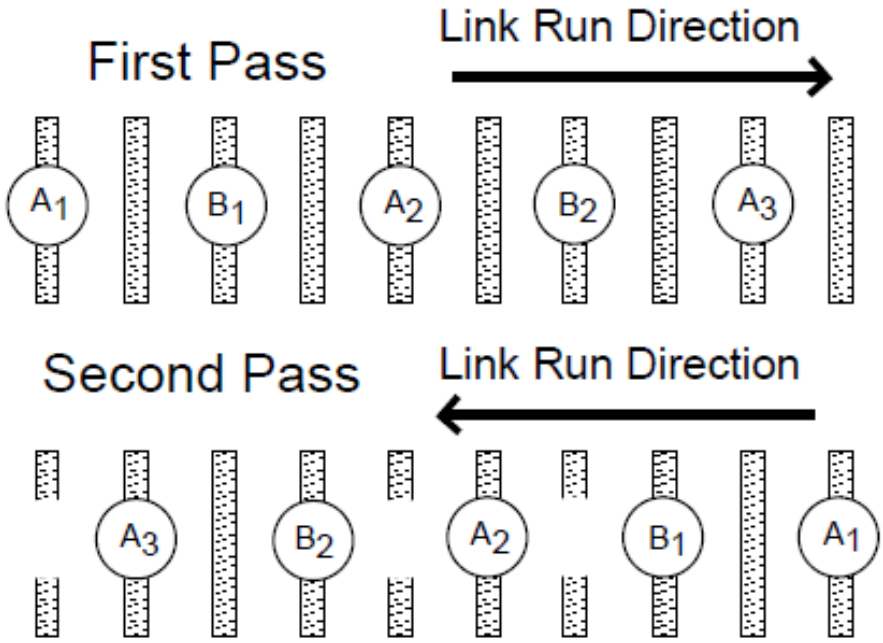

First Pass
Link Run Direction
A1
B1
A2
B2
A3
Second Pass
Link Run Direction
A3
B2
A2
B1
A1

FIG. 10

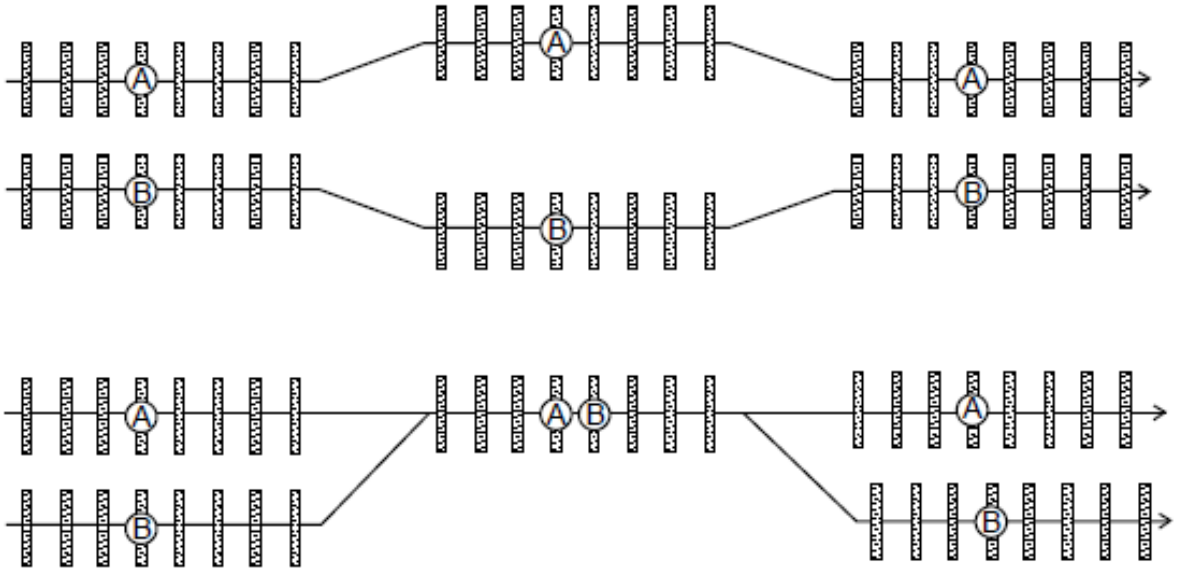

A
B

FIG. 11

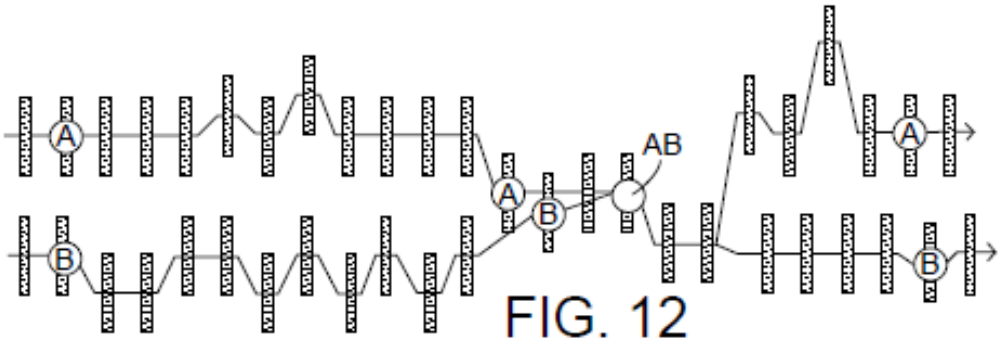


FIG. 12

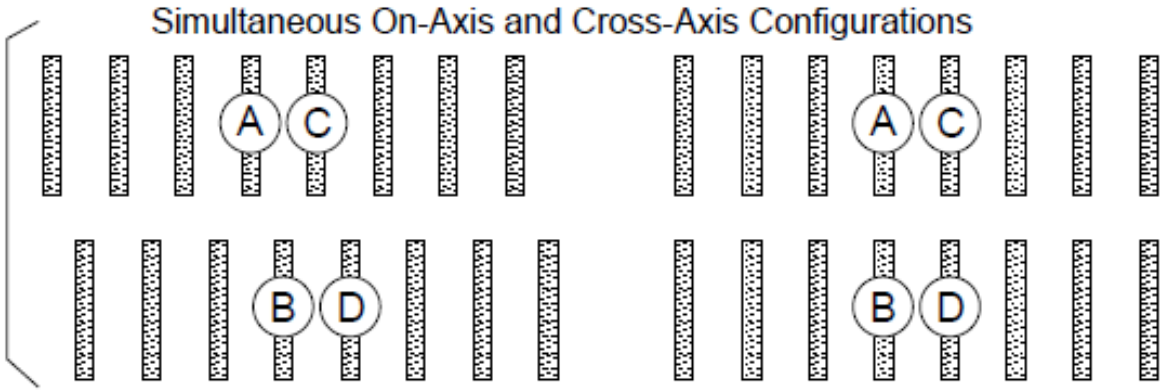


FIG. 13

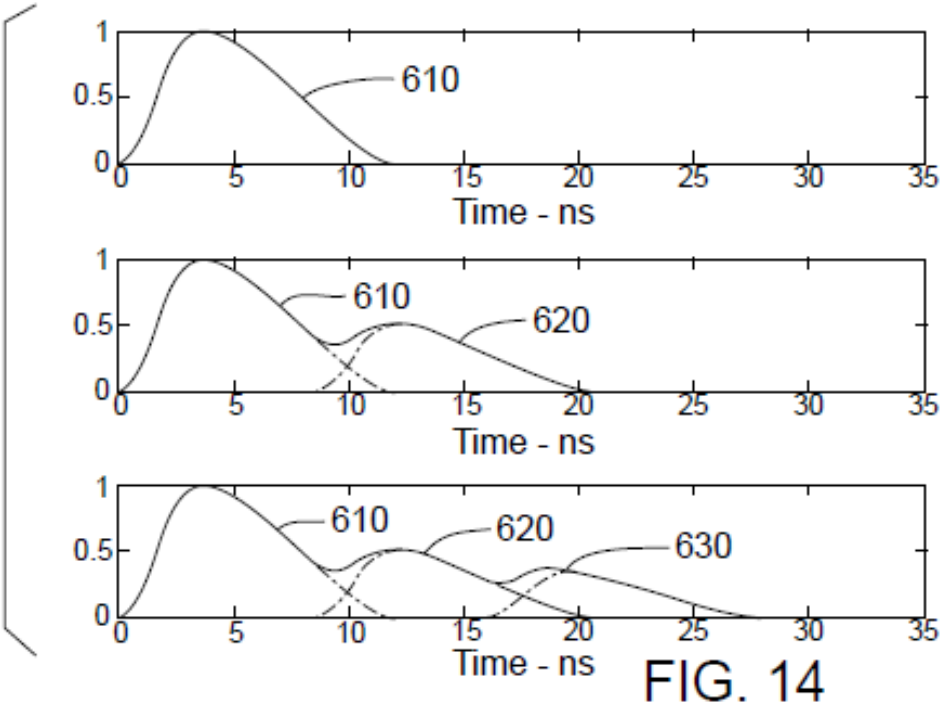


FIG. 14

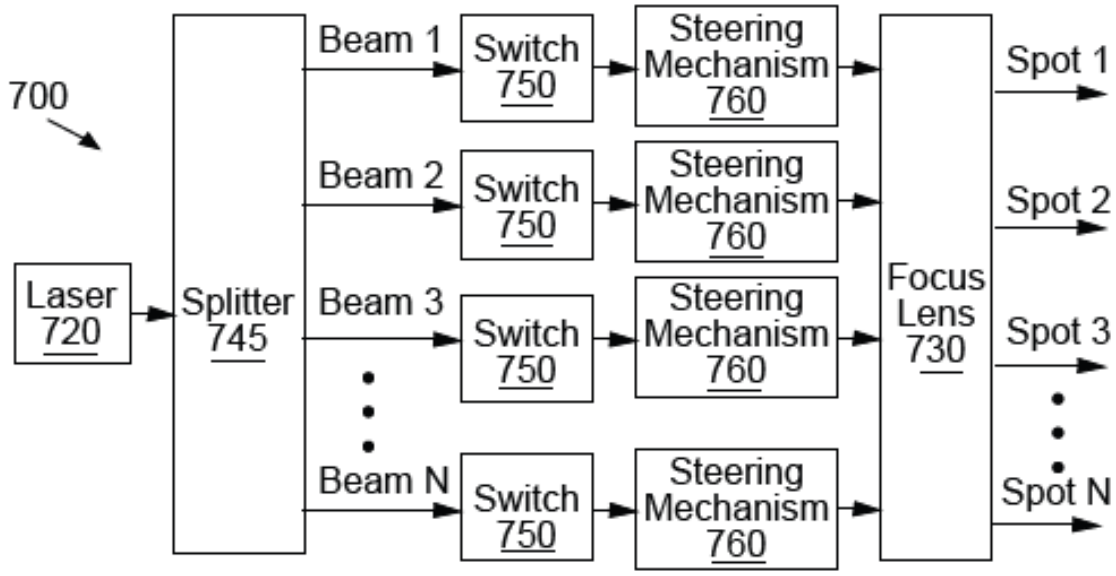


FIG. 15

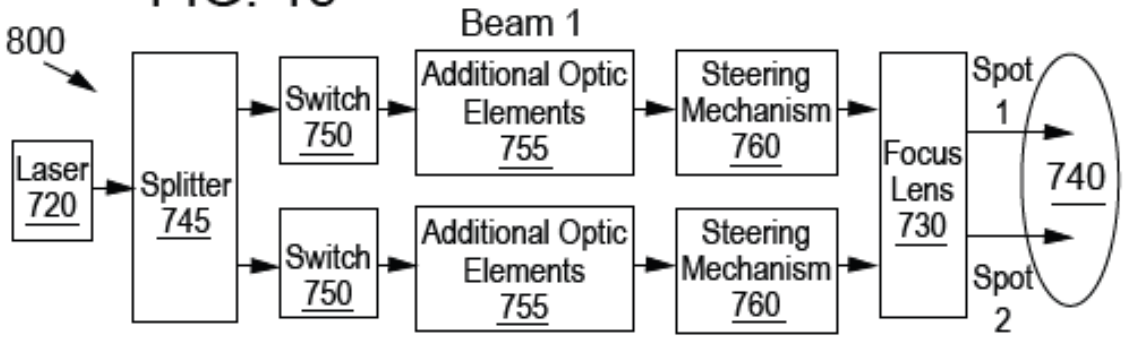


FIG. 16

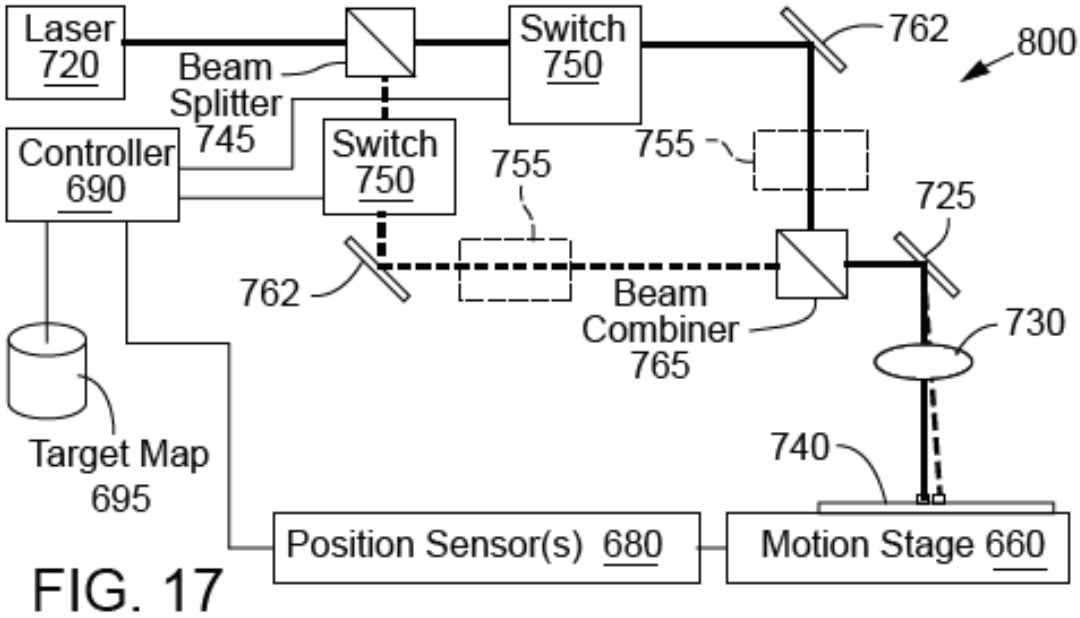


FIG. 17

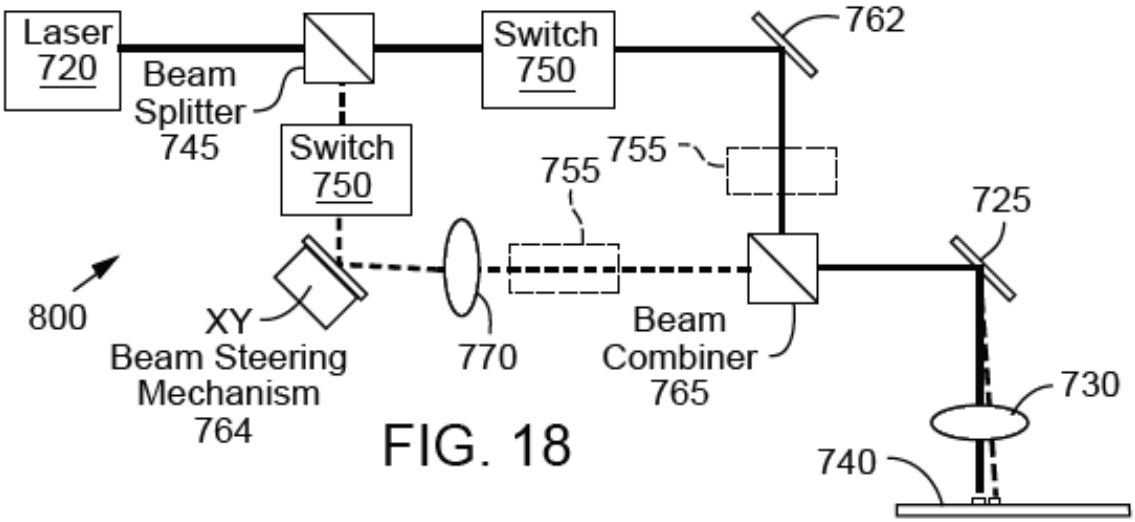

Laser
720
Beam
Splitter
745
Switch
750
762
Switch
750
755
755
725
800
XY
Beam Steering
Mechanism
764
770
Beam
Combiner
765
730
740

FIG. 18

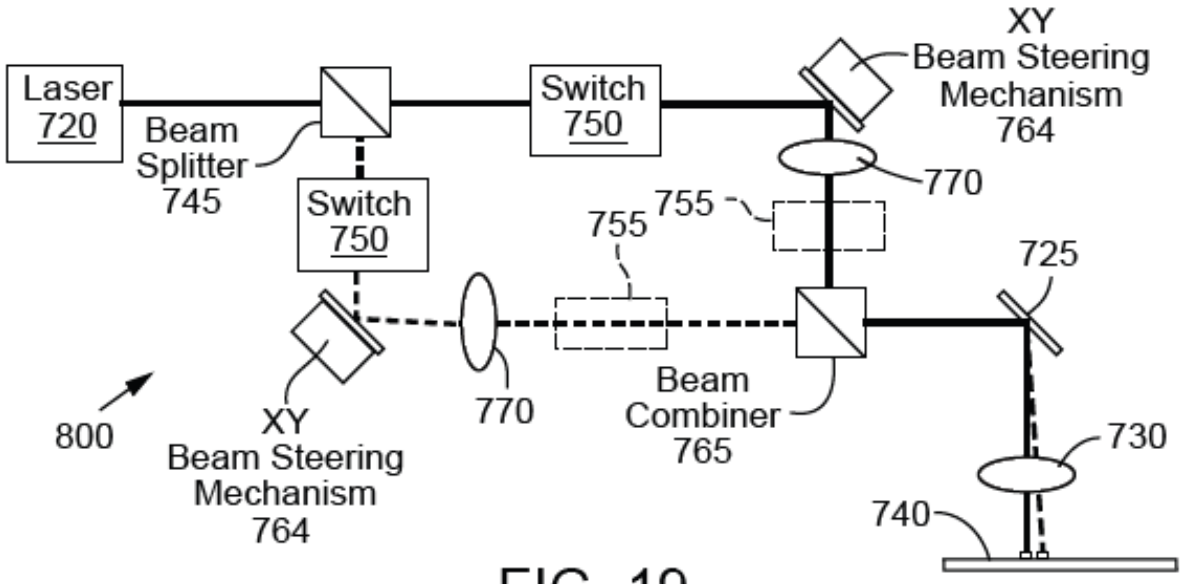

XY
Beam Steering
Mechanism
764
Laser
720
Beam
Splitter
745
Switch
750
Switch
750
770
755
755
725
800
XY
Beam Steering
Mechanism
764
770
Beam
Combiner
765
730
740

FIG. 19

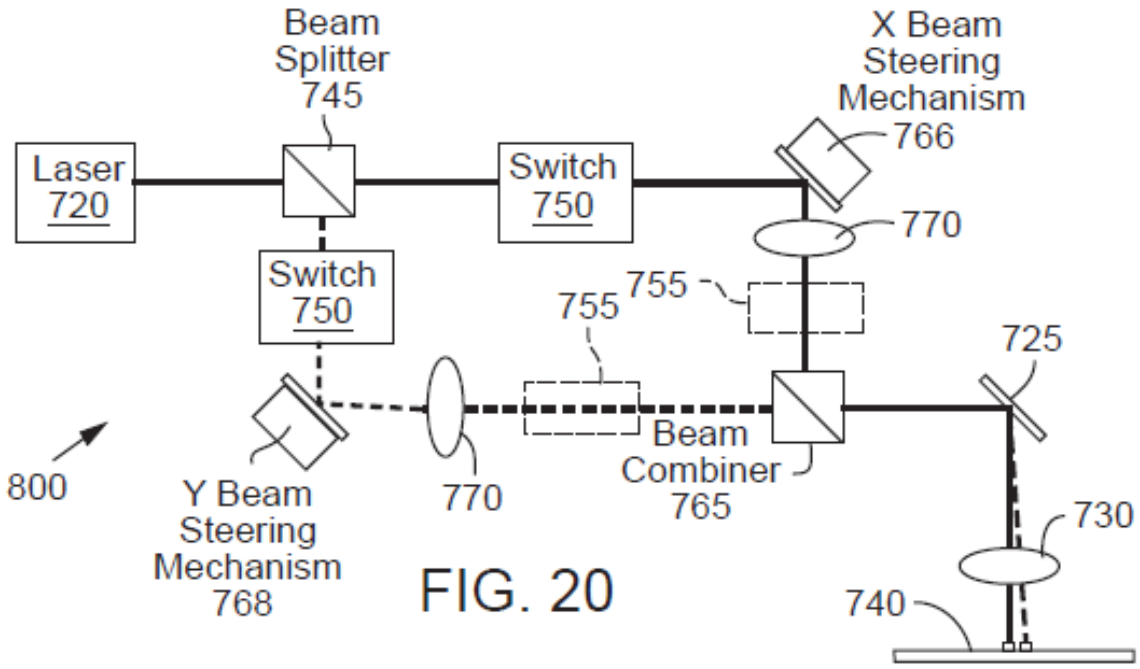

Beam
Splitter
745
X Beam
Steering
Mechanism
766
Laser
720
Switch
750
770
Switch
750
755
755
725
800
Beam
Combiner
765
Y Beam
Steering
Mechanism
768
770
730
740

FIG. 20

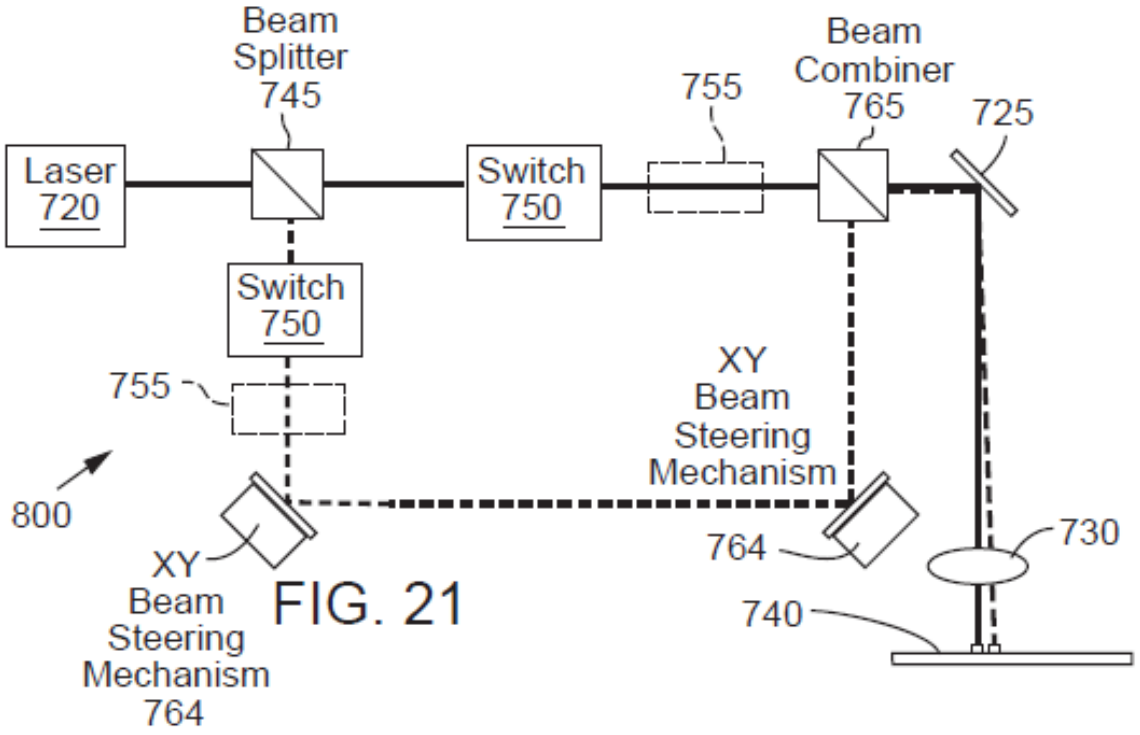

Beam
Splitter
745
755
Beam
Combiner
765
725
Laser
720
Switch
750
Switch
750
755
XY
Beam
Steering
Mechanism
800
764
730
XY
Beam
Steering
Mechanism
764
740

FIG. 21

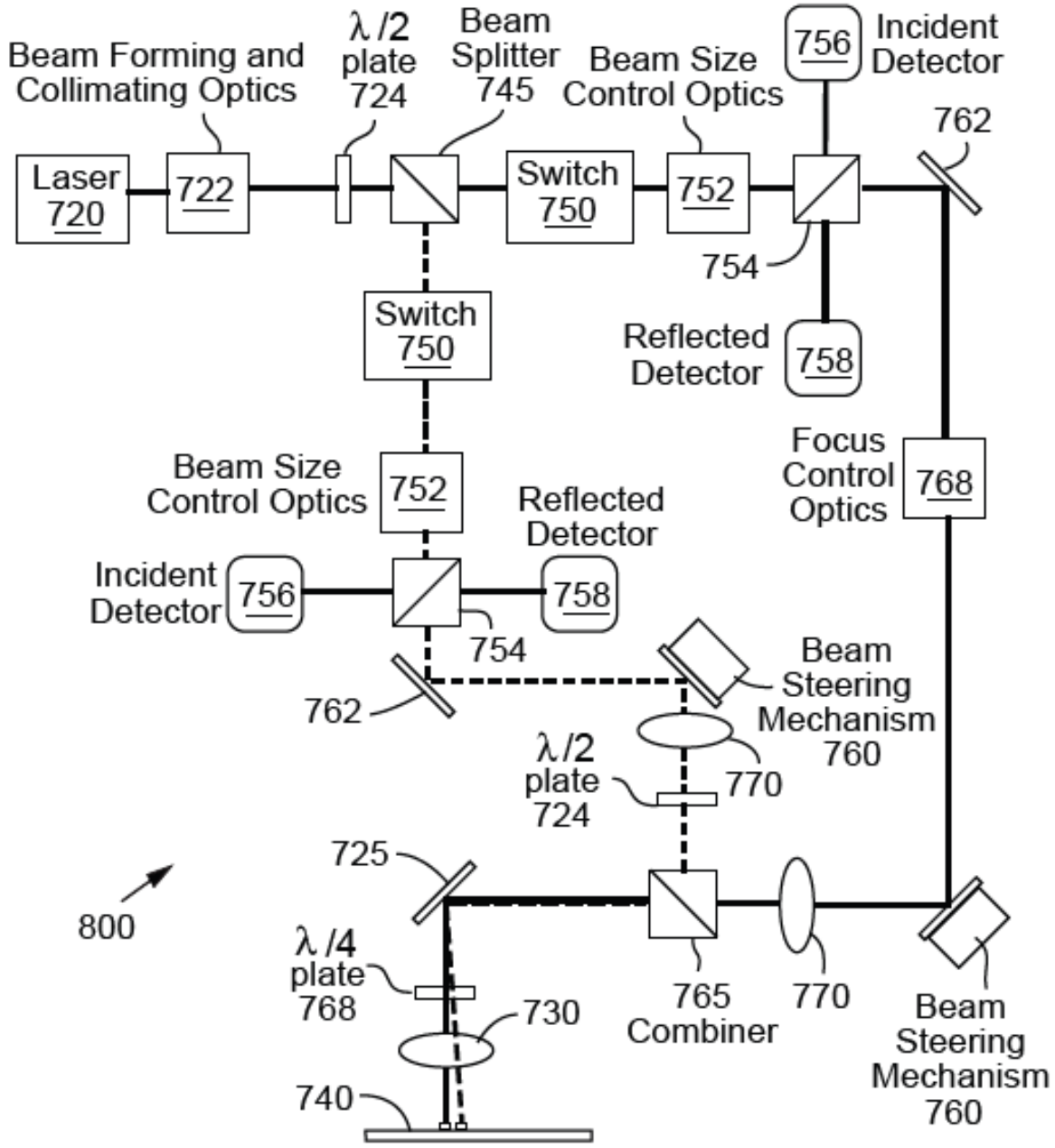

Beam Forming and Collimating Optics
λ/2 plate 724
Beam Splitter 745
Beam Size Control Optics
756
Incident Detector
762
Laser 720
722
Switch 750
752
754
Switch 750
Reflected Detector
758
Beam Size Control Optics
752
Reflected Detector
Focus Control Optics
768
Incident Detector
756
758
754
762
Beam Steering Mechanism 760
λ/2 plate 724
770
725
800
λ/4 plate 768
730
740
765 Combiner
770
Beam Steering Mechanism 760

FIG. 22

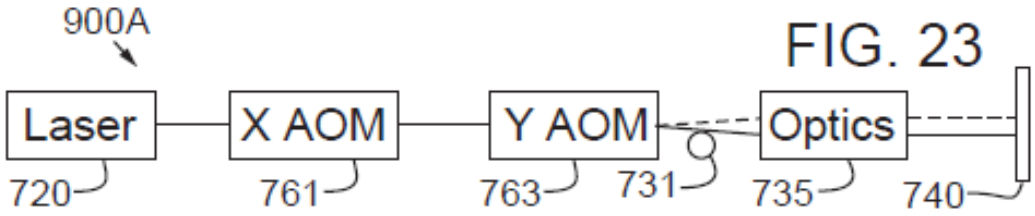

900A
Laser
X AOM
Y AOM
Optics
720
761
763
731
735
740

FIG. 23

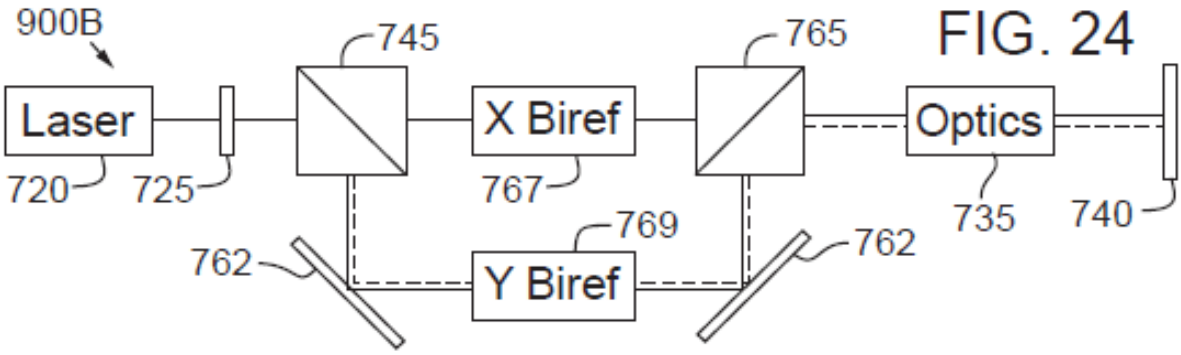

900B
745
765
Laser
X Biref
Optics
720
725
767
735
740
769
762
762
Y Biref

FIG. 24

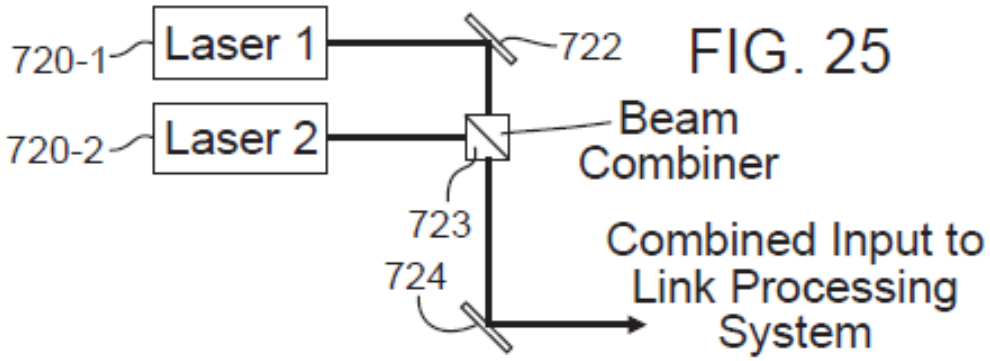

720-1
Laser 1
720-2
Laser 2
722
Beam
Combiner
723
724
Combined Input to
Link Processing
System

FIG. 25

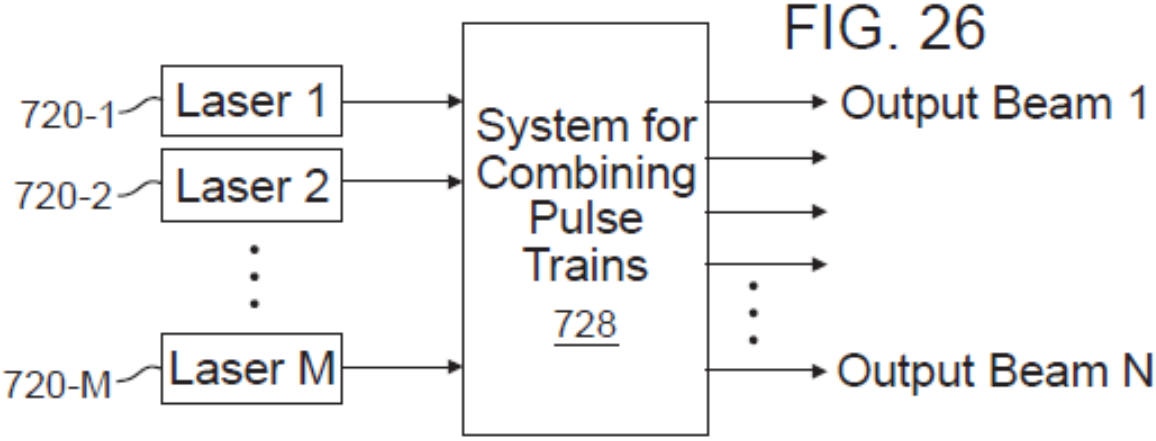

720-1
Laser 1
720-2
Laser 2
720-M
Laser M
System for
Combining
Pulse
Trains
728
Output Beam 1
Output Beam N

FIG. 26

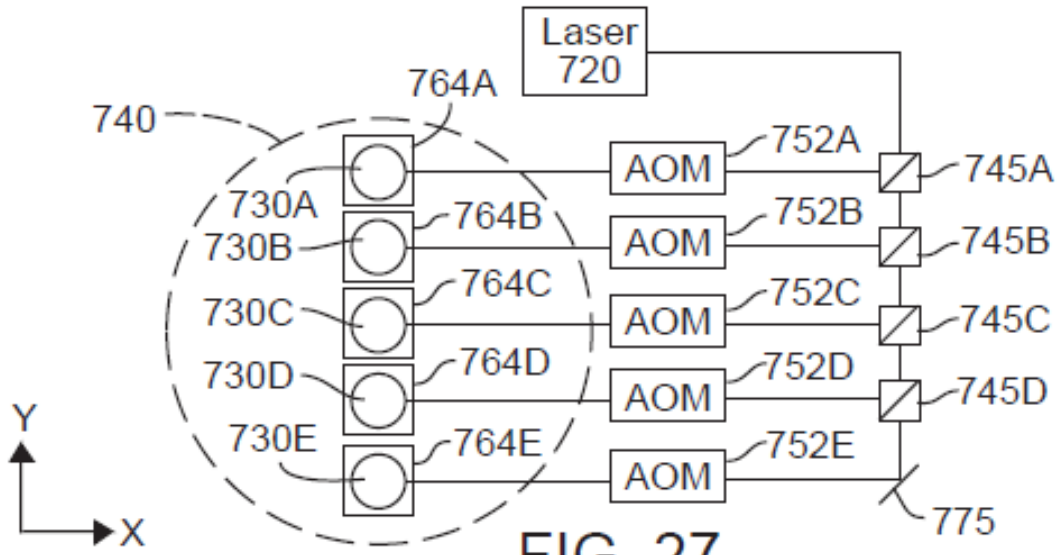

Laser
720
764A
740
752A
AOM
745A
730A
764B
752B
730B
AOM
745B
764C
752C
730C
AOM
745C
764D
752D
730D
AOM
745D
730E
764E
752E
AOM
775
Y
X

FIG. 27

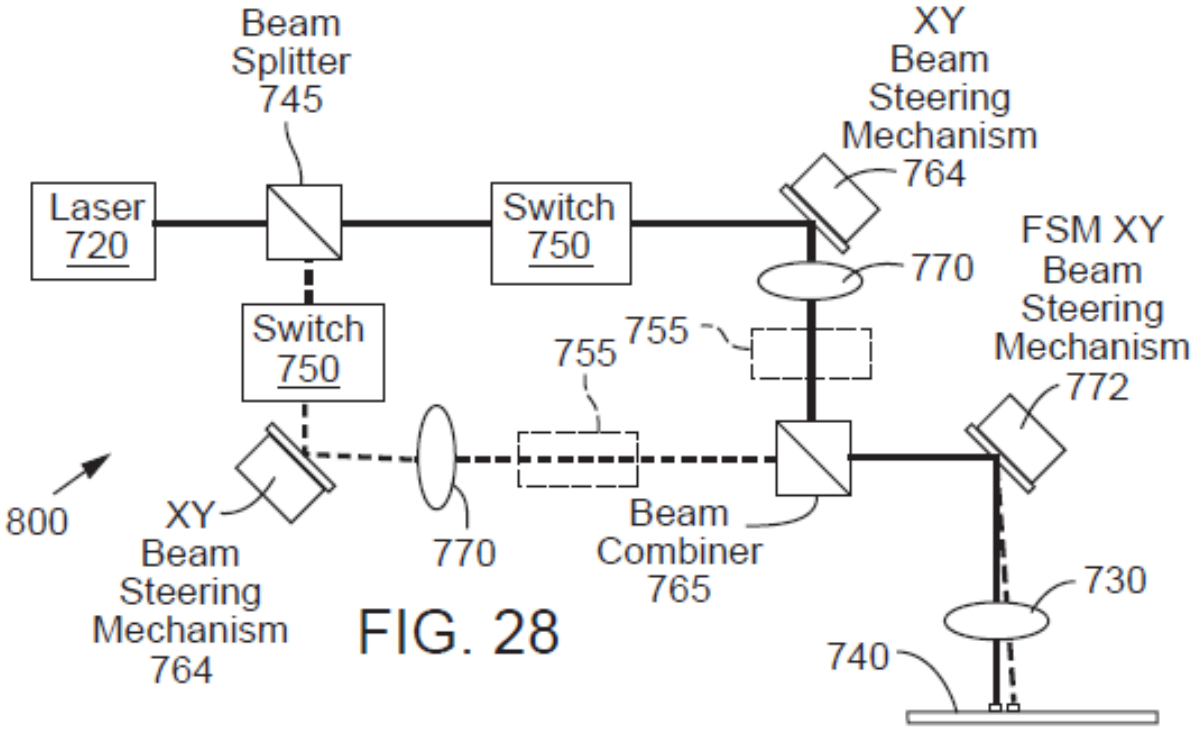

Beam
Splitter
745
XY
Beam
Steering
Mechanism
764
Laser
720
Switch
750
770
FSM XY
Beam
Steering
Mechanism
772
Switch
750
755
755
800
XY
Beam
Steering
Mechanism
764
770
Beam
Combiner
765
730
740

FIG. 28

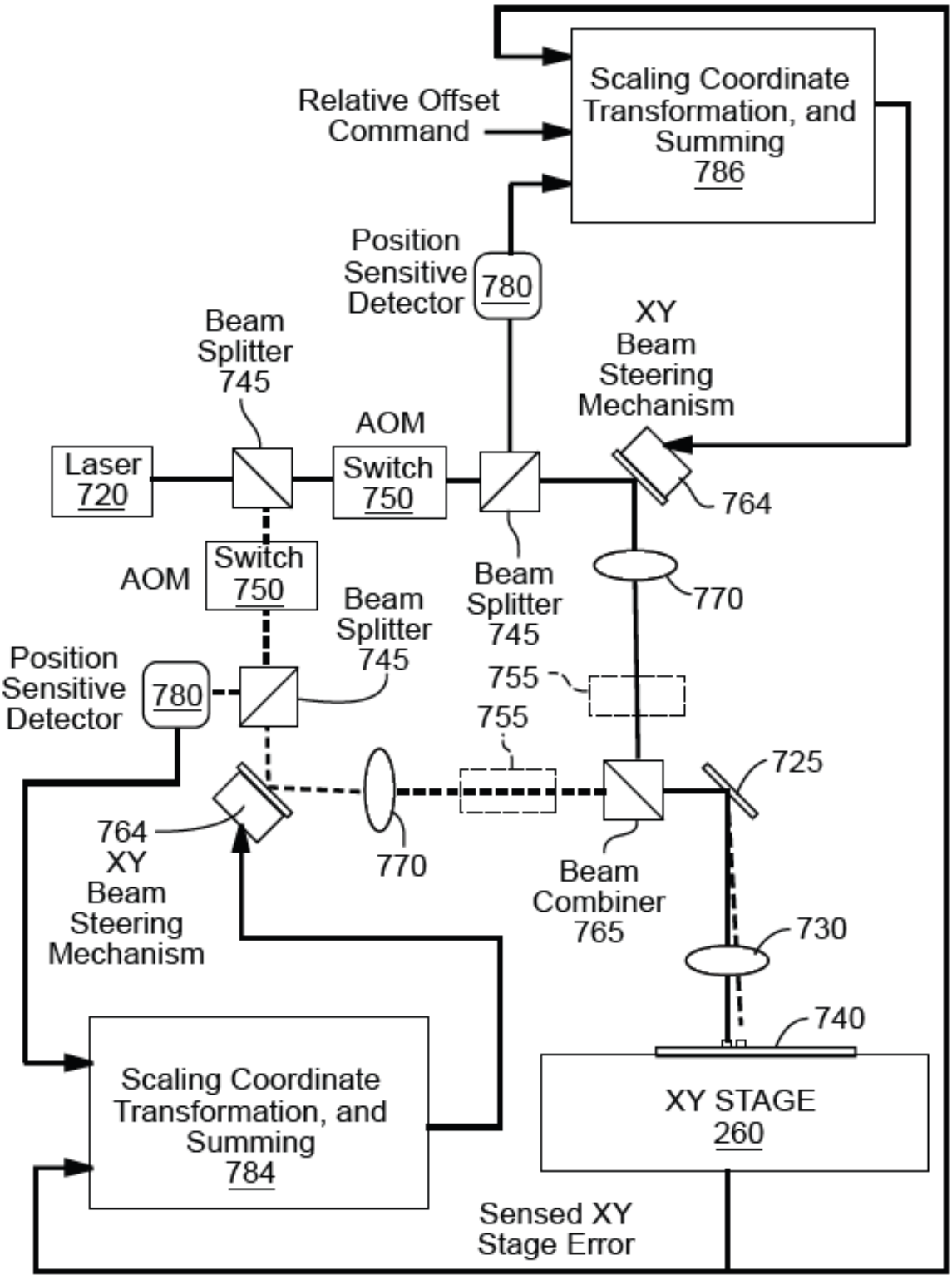

Scaling Coordinate Transformation, and Summing 786
Relative Offset Command
Position Sensitive Detector 780
Beam Splitter 745
AOM Switch 750
XY Beam Steering Mechanism
Laser 720
764
AOM Switch 750
Beam Splitter 745
770
Beam Splitter 745
Position Sensitive Detector 780
755
755
725
764 XY Beam Steering Mechanism
770
Beam Combiner 765
730
740
Scaling Coordinate Transformation, and Summing 784
XY STAGE 260
Sensed XY Stage Error

FIG. 29

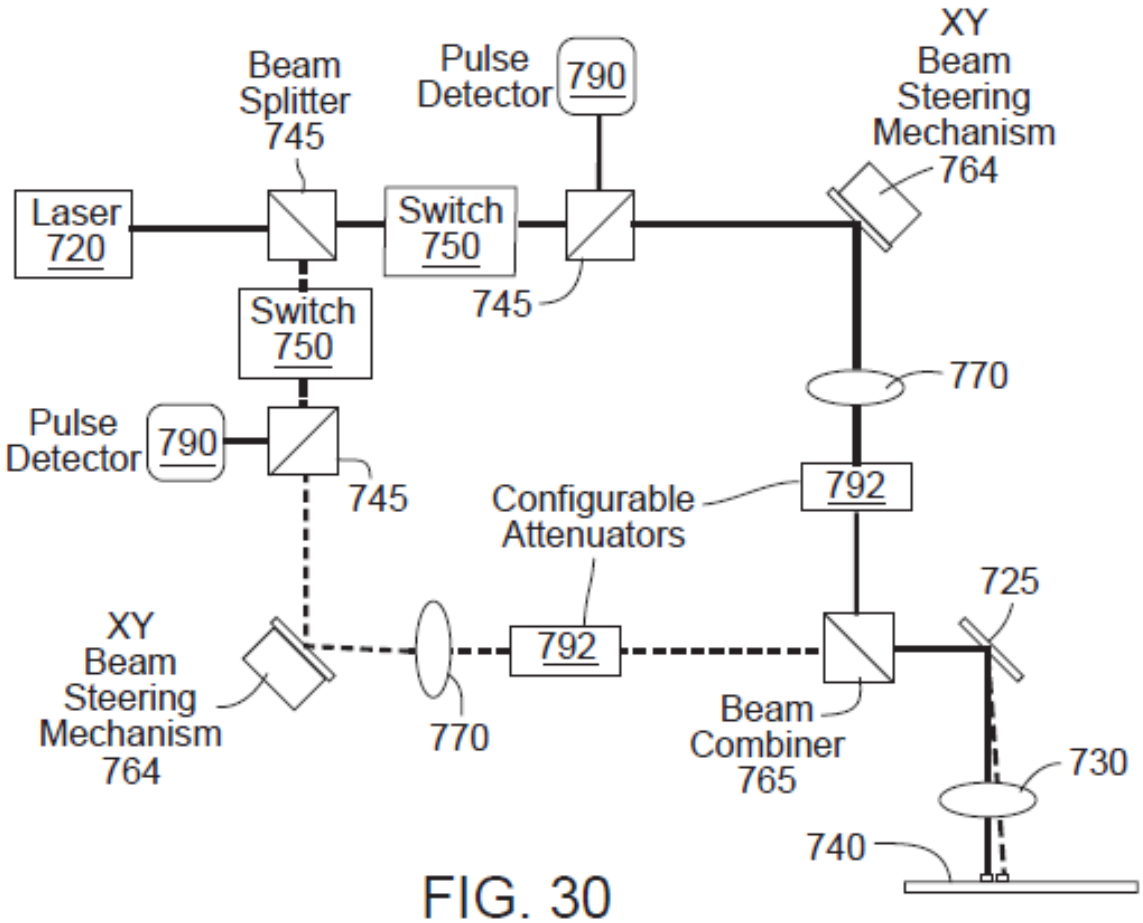

Beam Splitter 745
Pulse Detector 790
XY Beam Steering Mechanism 764
Laser 720
Switch 750
745
Switch 750
770
Pulse Detector 790
745
Configurable Attenuators
792
XY Beam Steering Mechanism 764
770
792
725
Beam Combiner 765
730
740

FIG. 30

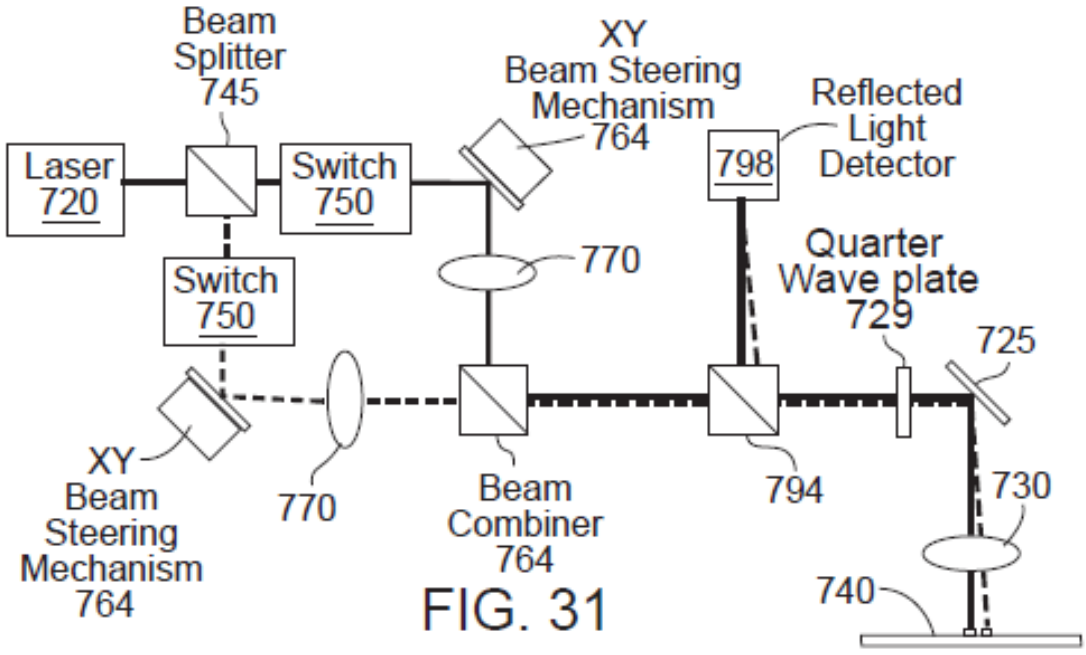

Beam Splitter 745
XY Beam Steering Mechanism 764
Reflected Light Detector
798
Laser 720
Switch 750
770
Switch 750
Quarter Wave plate 729
725
XY Beam Steering Mechanism 764
770
Beam Combiner 764
794
730
740

FIG. 31

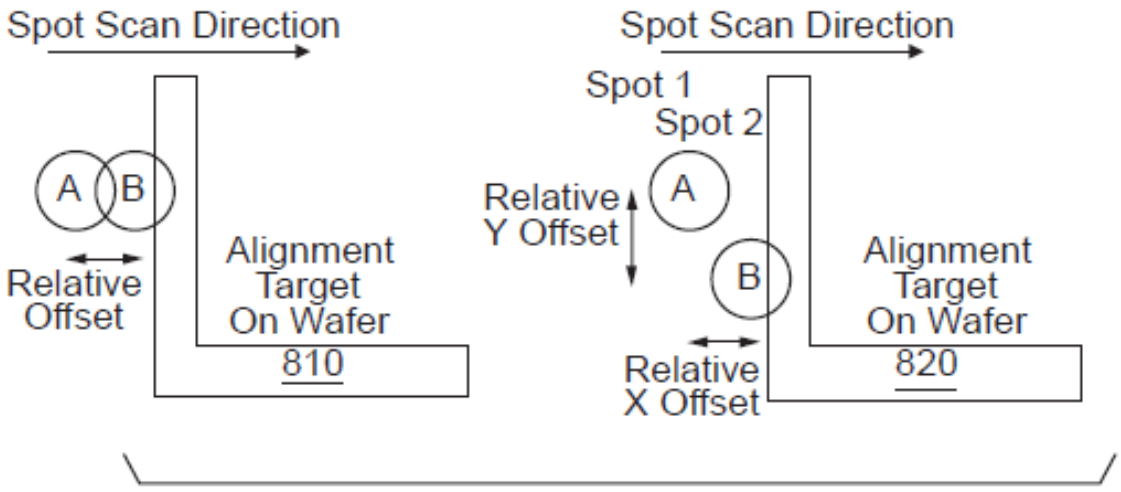

Spot Scan Direction
A
B
Relative
Offset
Alignment
Target
On Wafer
810
Spot Scan Direction
Spot 1
Spot 2
Relative
Y Offset
A
B
Relative
X Offset
Alignment
Target
On Wafer
820

FIG. 32