Fig. 1a

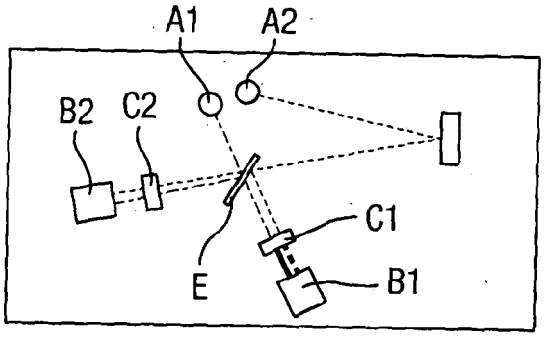


Fig. 1b

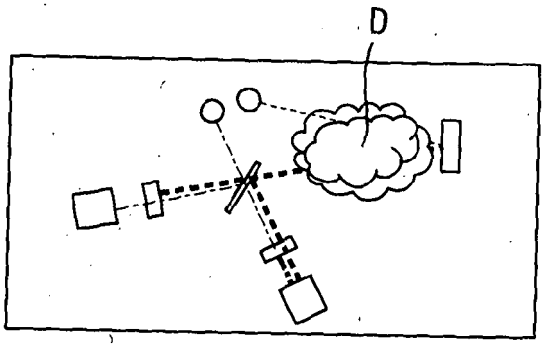


Fig. 2a

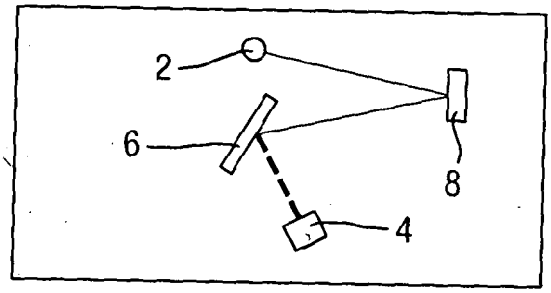


Fig. 2b

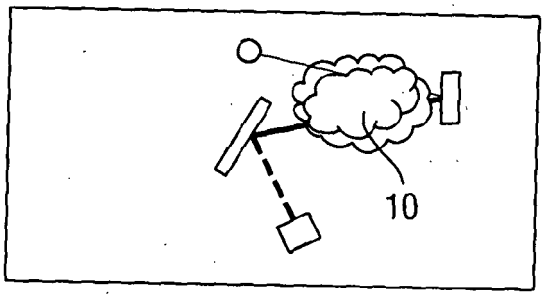


Fig. 3

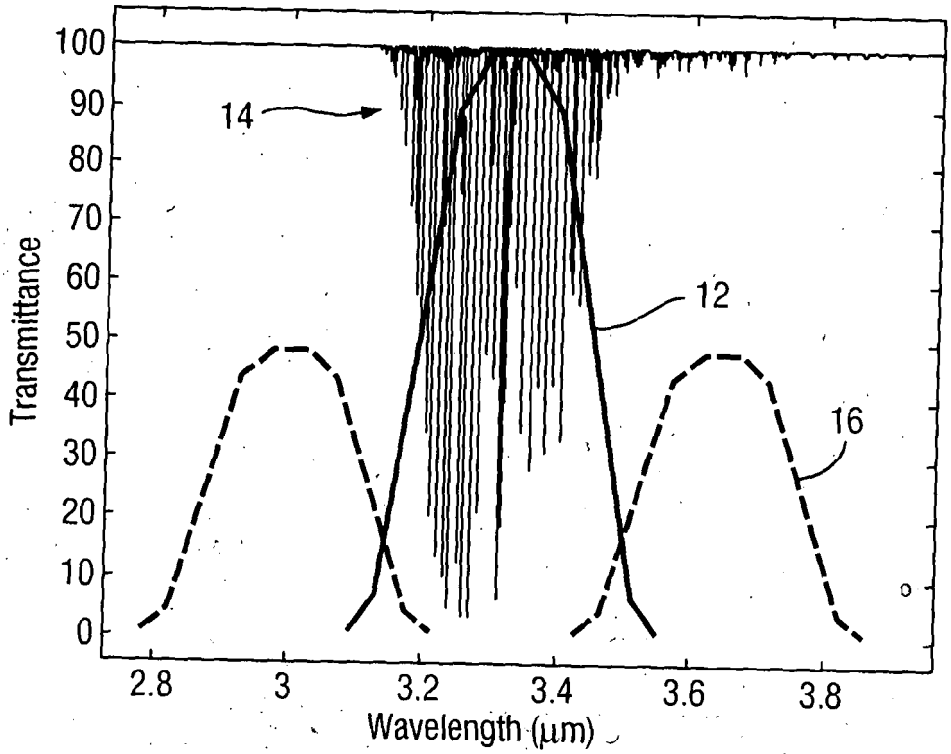


Fig. 4

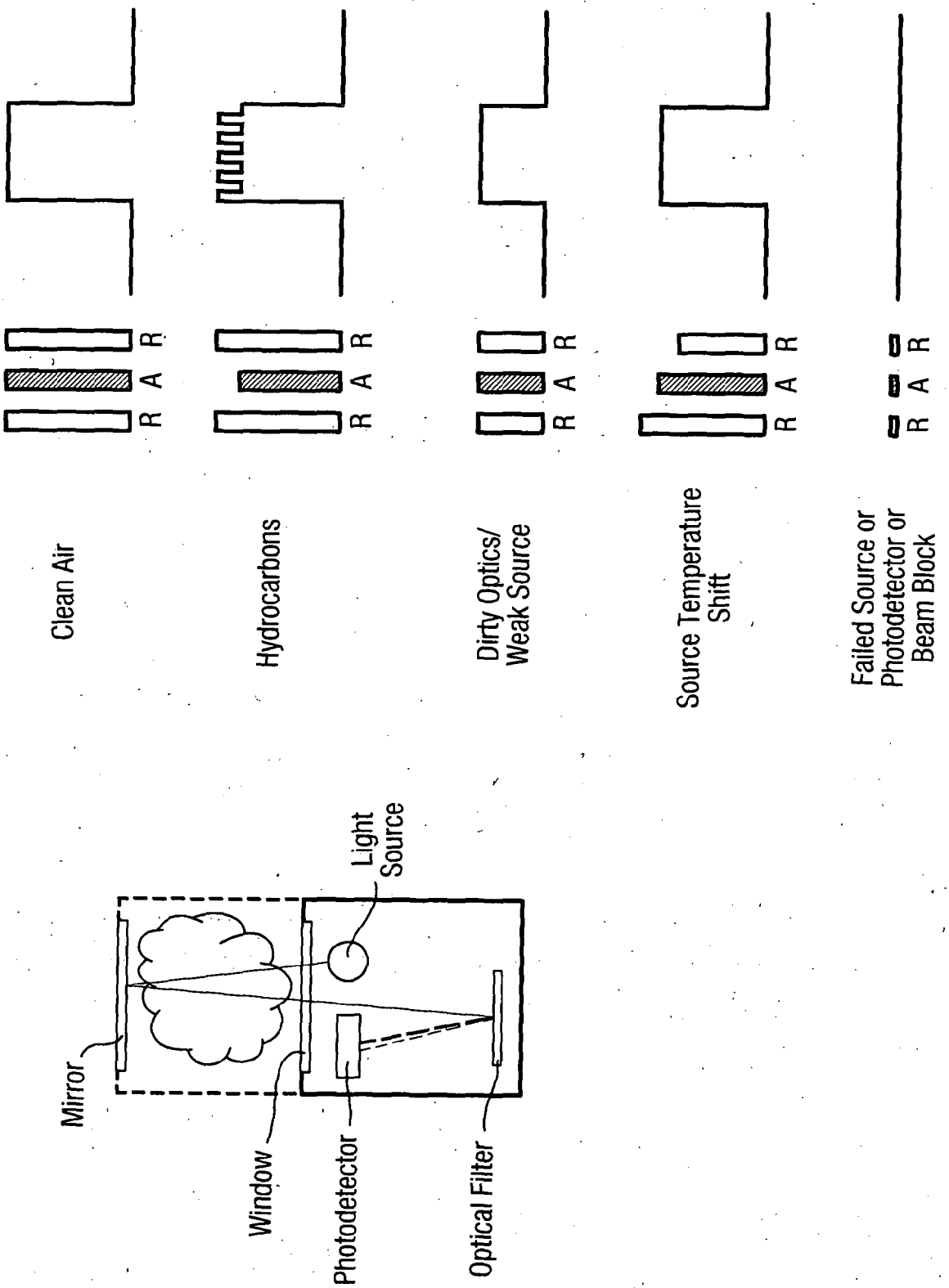

Clean Air
Hydrocarbons
Dirty Optics/
Weak Source
Source Temperature
Shift
Failed Source or
Photodetector or
Beam Block
R A R
Light
Source
Mirror
Window
Photodetector
Optical Filter

Fig. 5

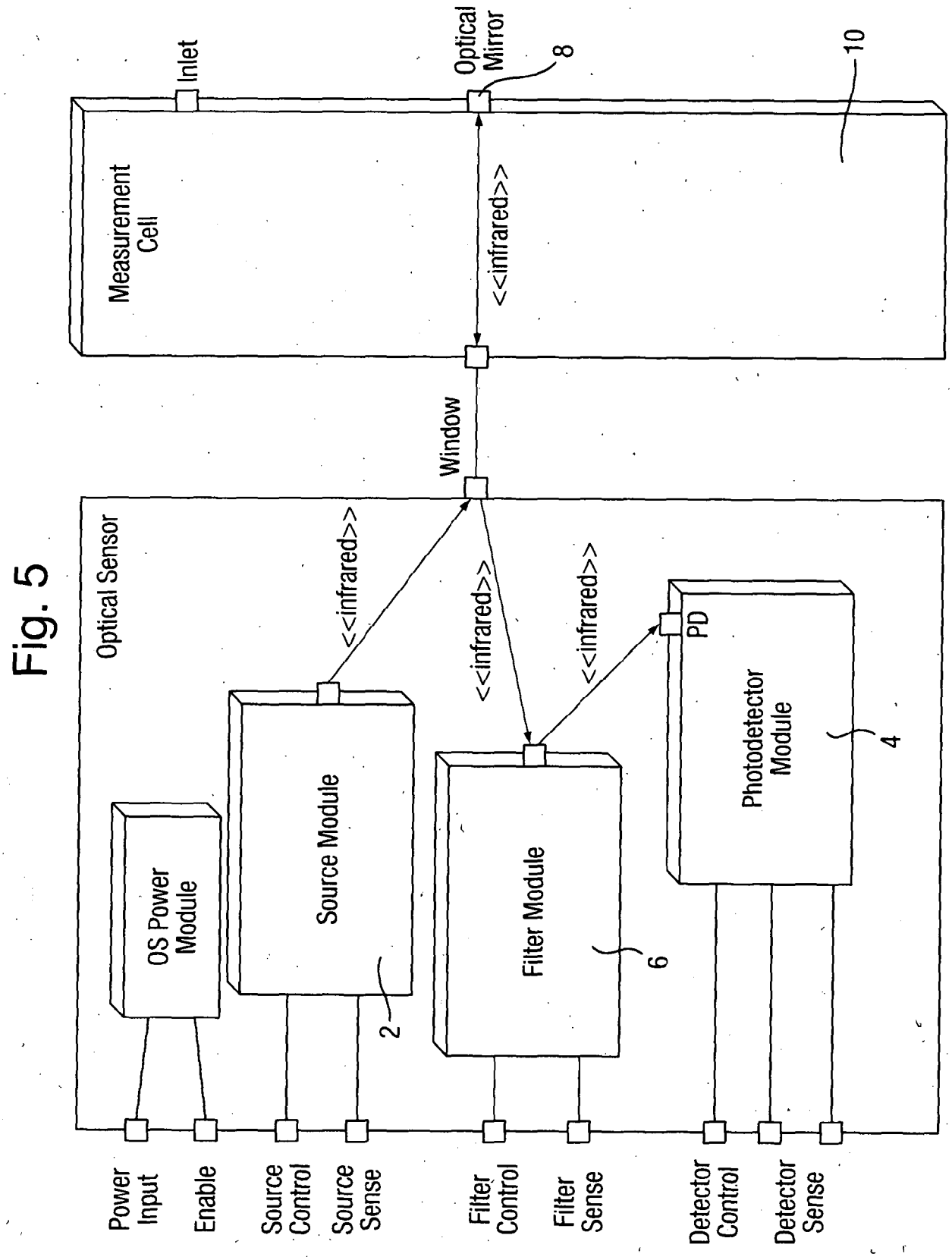

Inlet
Optical Mirror
8
10
Measurement Cell
<<infrared>>
Window
Optical Sensor
<<infrared>>
<<infrared>>
<<infrared>>
PD
Photodetector Module
4
OS Power Module
Source Module
2
Filter Module
6
Power Input
Enable
Source Control
Source Sense
Filter Control
Filter Sense
Detector Control
Detector Sense

Fig. 6

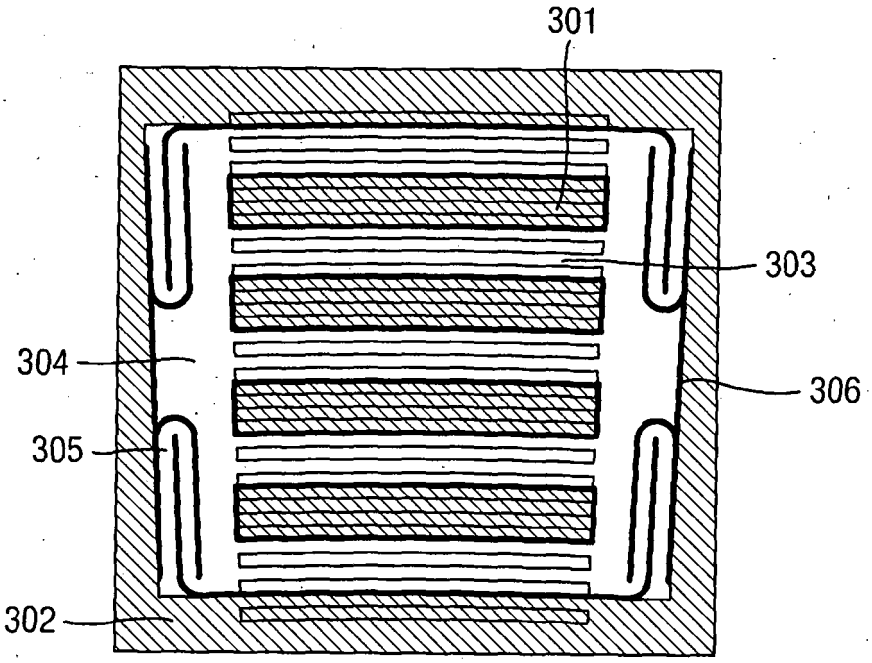


Fig. 7

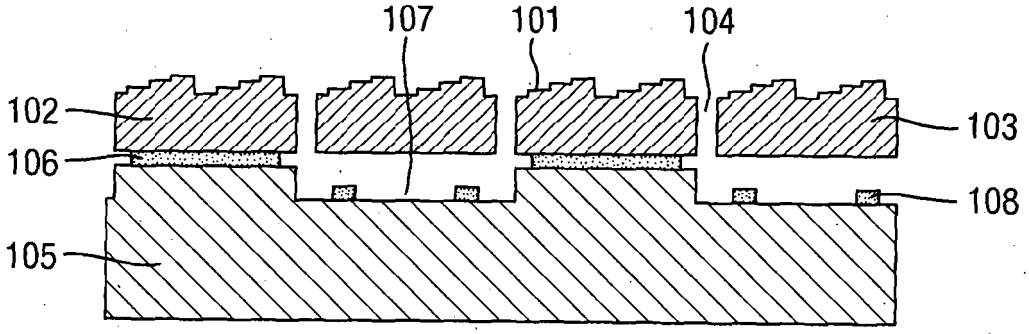
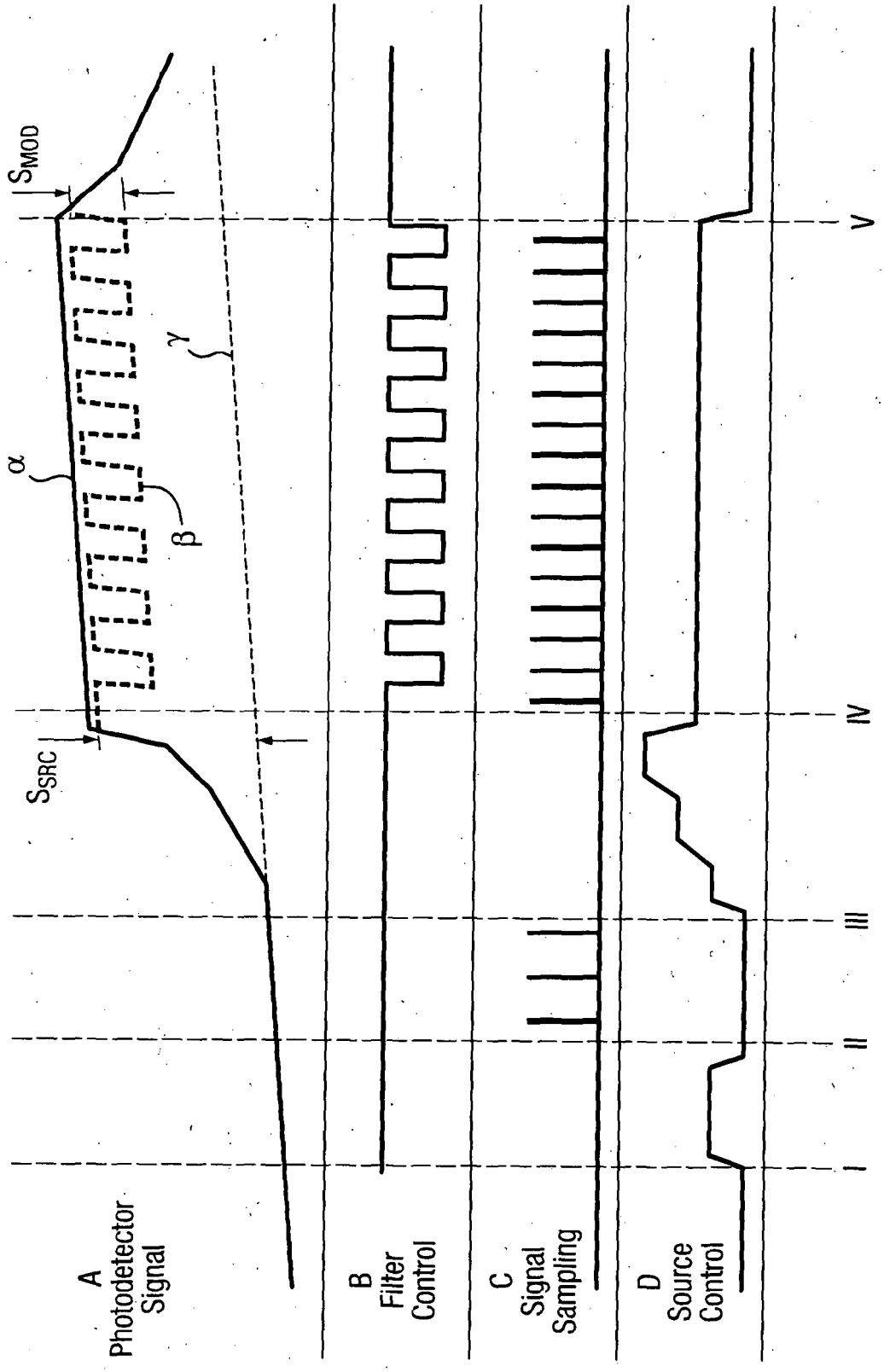


Fig. 8


A
Photodetector
Signal
B
Filter
Control
C
Signal
Sampling
D
Source
Control
S_{MOD}
S_{SRC}
α
β
γ
I
II
III
IV
V