

X-RAY BACK SCATTERING FOR INSPECTION OF PART

ABSTRACT

Described herein is an x-ray backscatter apparatus 10/100/109 for non-destructive
5 inspection of a part 110. The apparatus includes an x-ray emitter 12 and a zone plate 102.
The x-ray emitter 12 includes an x-ray shield 24, a vacuum tube 28, a cathode 30, and an
anode 32. The x-ray shield 24 has an emission aperture 26. The vacuum tube 28 is within
the x-ray shield 24. The cathode 30 and anode 32 are enclosed within the vacuum tube
28. The cathode 30 generates an electron emission. The anode 32 is located relative to the
10 cathode 30 to receive the electron emission and convert the electron emission to a hard x-
ray emission and is located relative to the emission aperture 26 to direct at least a portion
of the hard x-ray emission through the emission aperture. The zone plate 102 is external
to the x-ray shield 24 and located relative to the emission aperture 26 to receive the
portion of the hard x-ray emission and focus the portion into a focused hard x-ray
15 emission.

FIG.1B