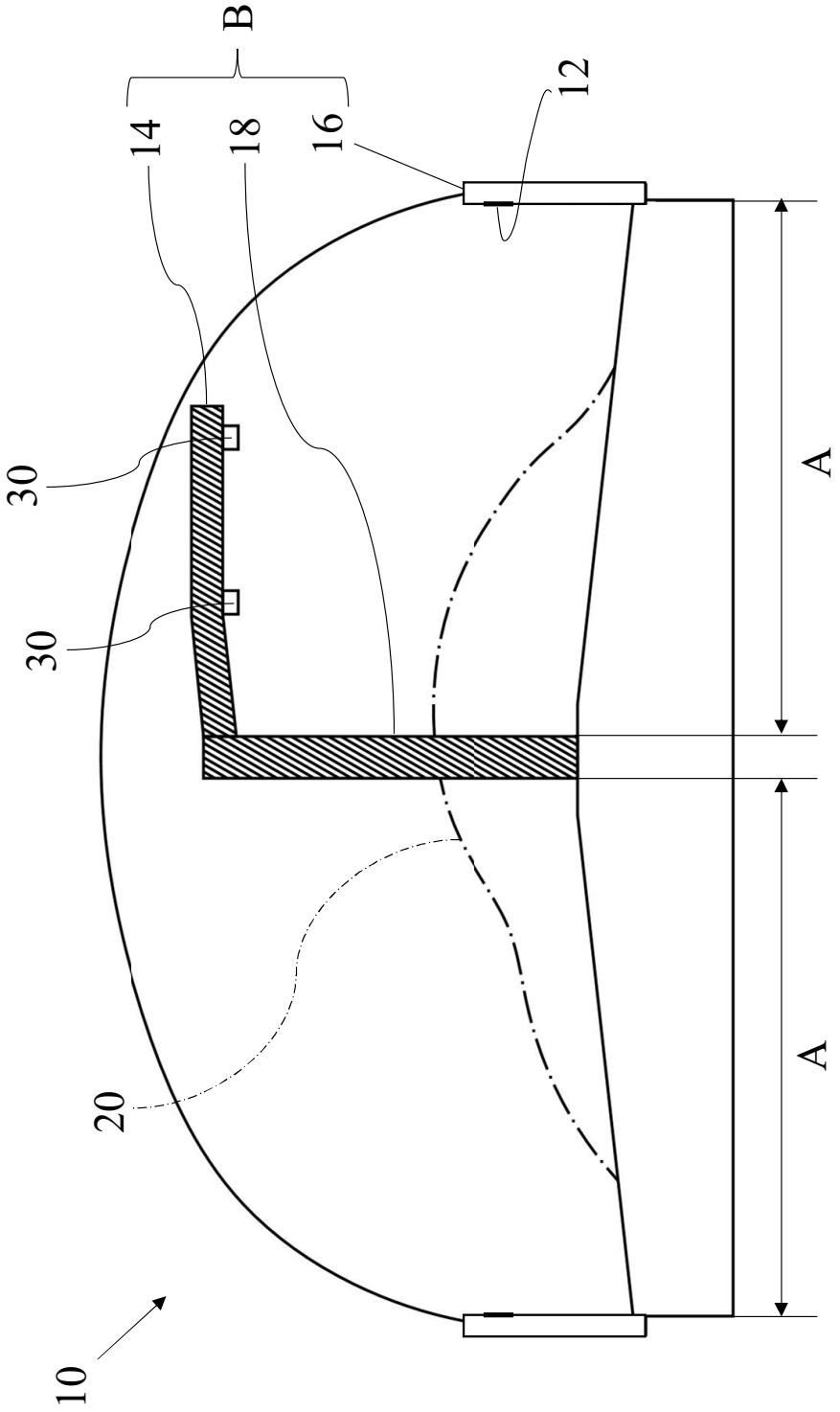

FIG.1

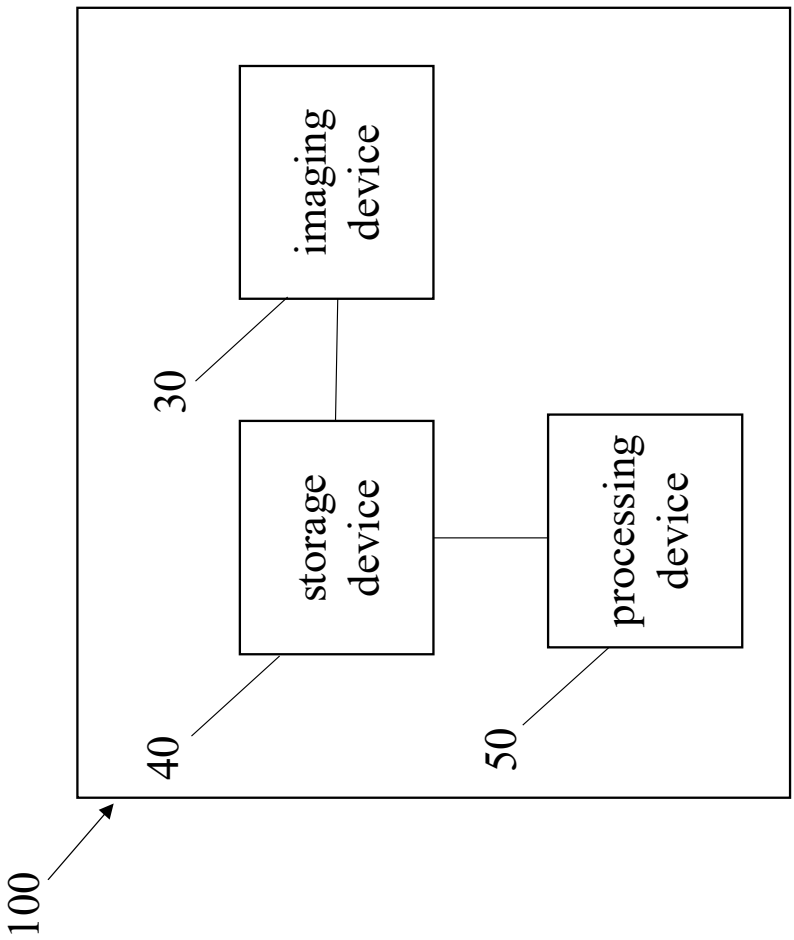
100
40
storage device
50
processing device
30
imaging device

FIG.2

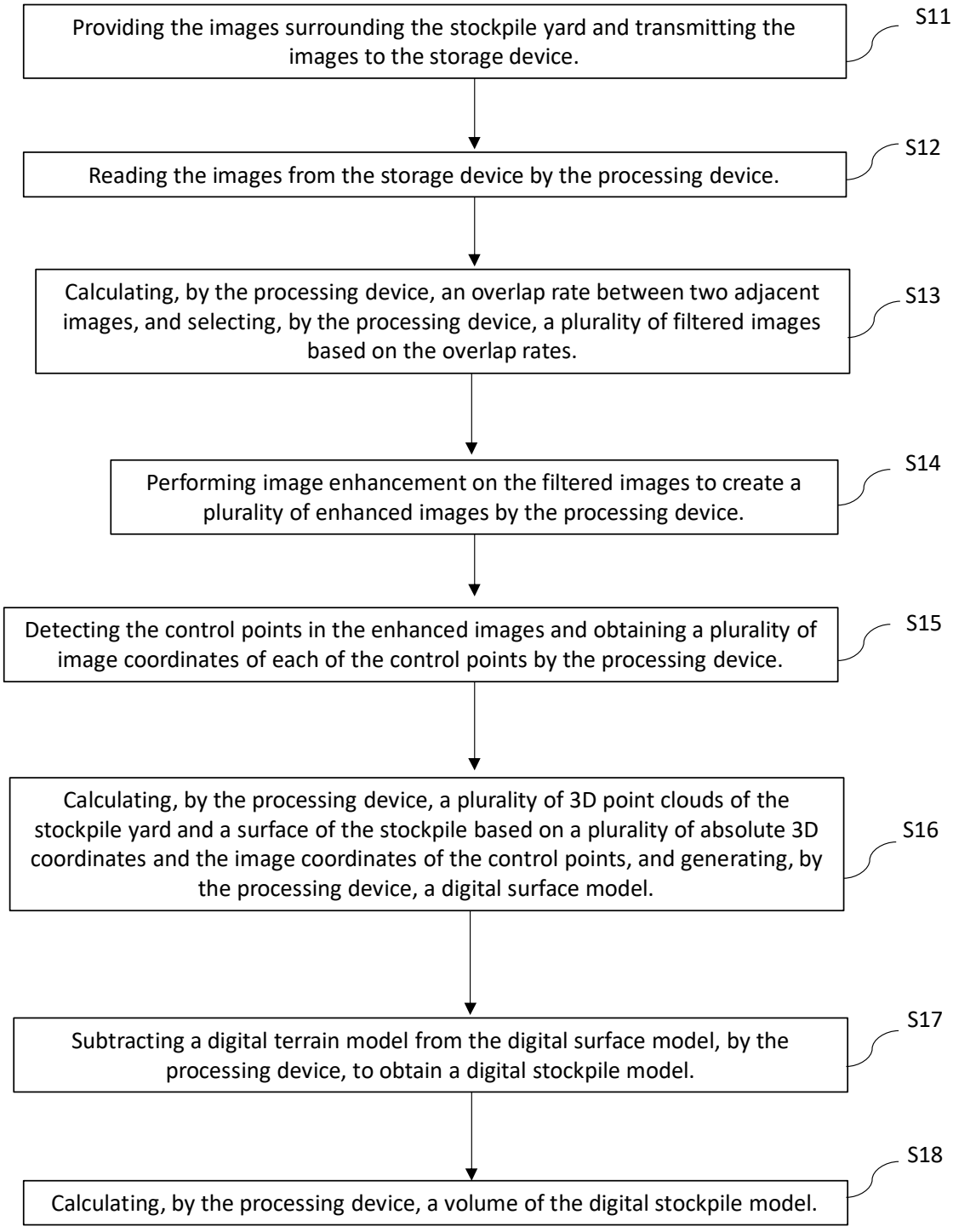
Providing the images surrounding the stockpile yard and transmitting the images to the storage device.
S11
Reading the images from the storage device by the processing device.
S12
Calculating, by the processing device, an overlap rate between two adjacent images, and selecting, by the processing device, a plurality of filtered images based on the overlap rates.
S13
Performing image enhancement on the filtered images to create a plurality of enhanced images by the processing device.
S14
Detecting the control points in the enhanced images and obtaining a plurality of image coordinates of each of the control points by the processing device.
S15
Calculating, by the processing device, a plurality of 3D point clouds of the stockpile yard and a surface of the stockpile based on a plurality of absolute 3D coordinates and the image coordinates of the control points, and generating, by the processing device, a digital surface model.
S16
Subtracting a digital terrain model from the digital surface model, by the processing device, to obtain a digital stockpile model.
S17
Calculating, by the processing device, a volume of the digital stockpile model.
S18

FIG.3

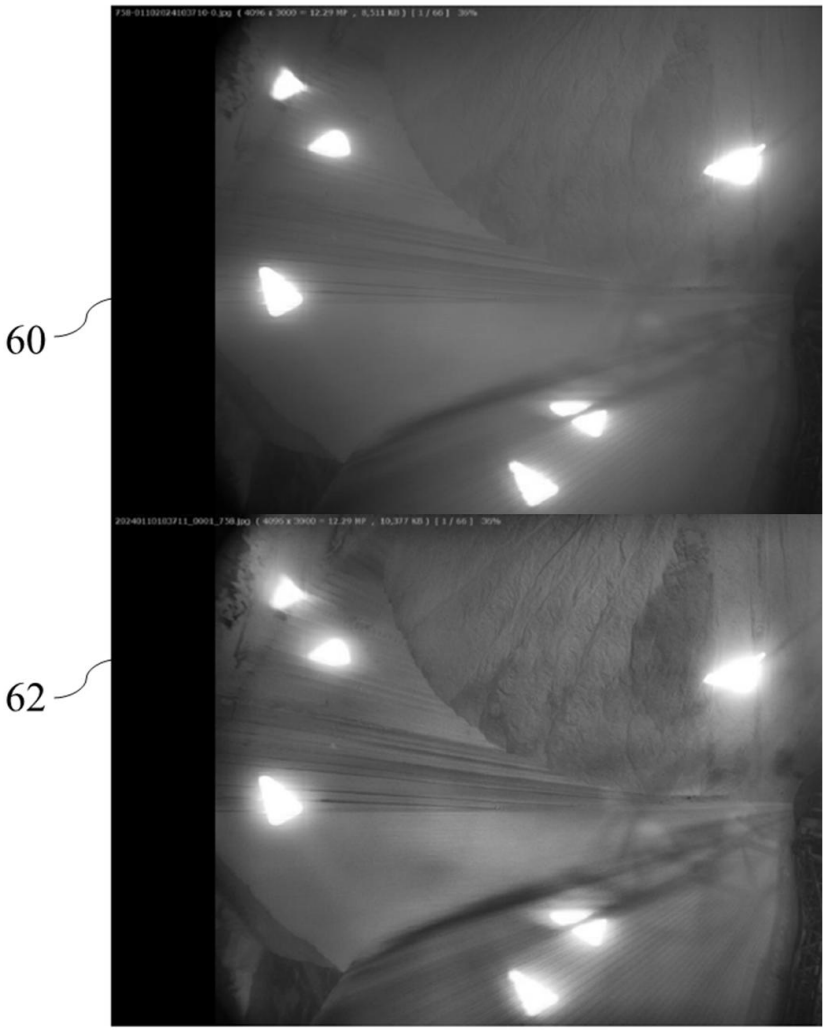

FIG.4

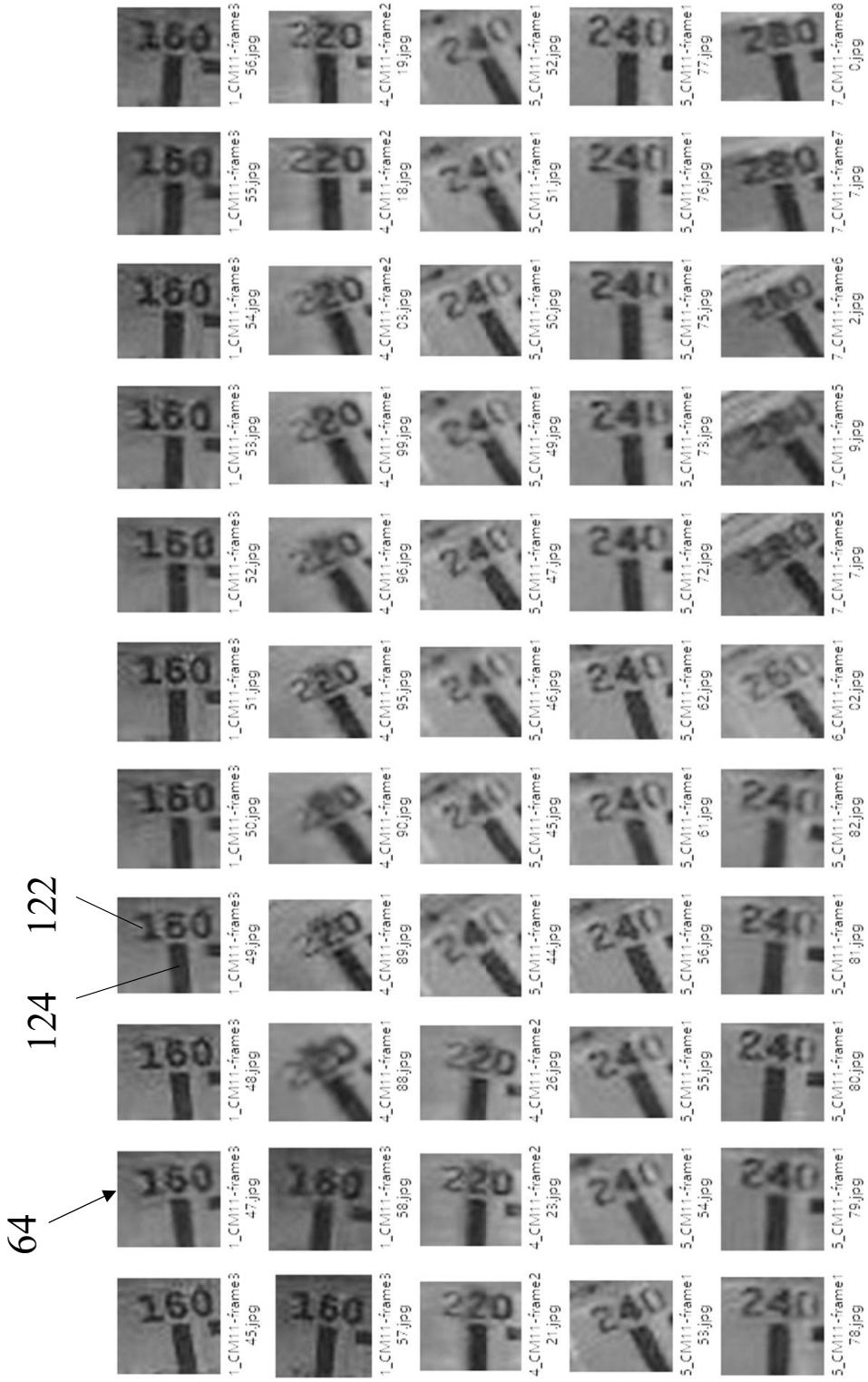

FIG.5

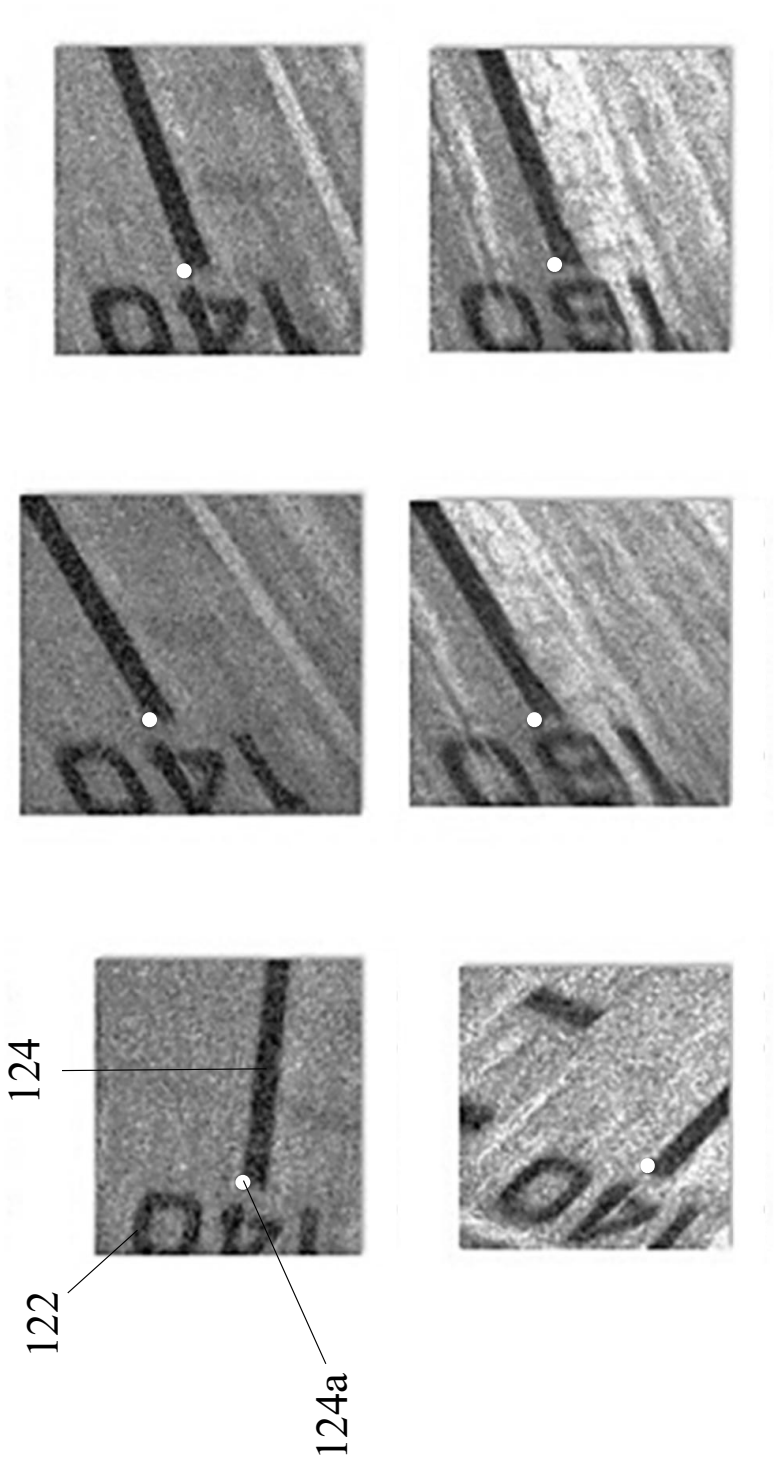

FIG.6

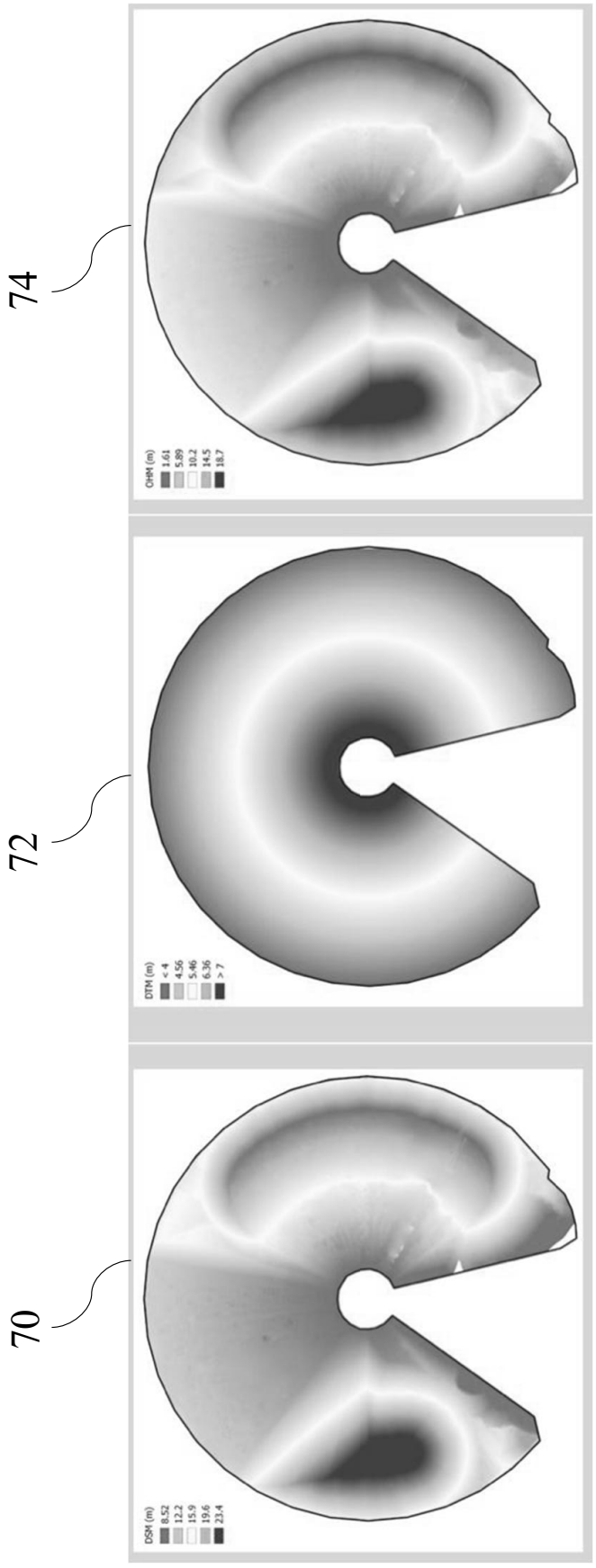
70
72
74
DSM (m)
8.52
12.2
15.9
19.6
23.4
DTM (m)
< 4
4.56
5.46
6.36
> 7
CHM (m)
1.61
5.89
10.2
14.5
18.7

FIG.7