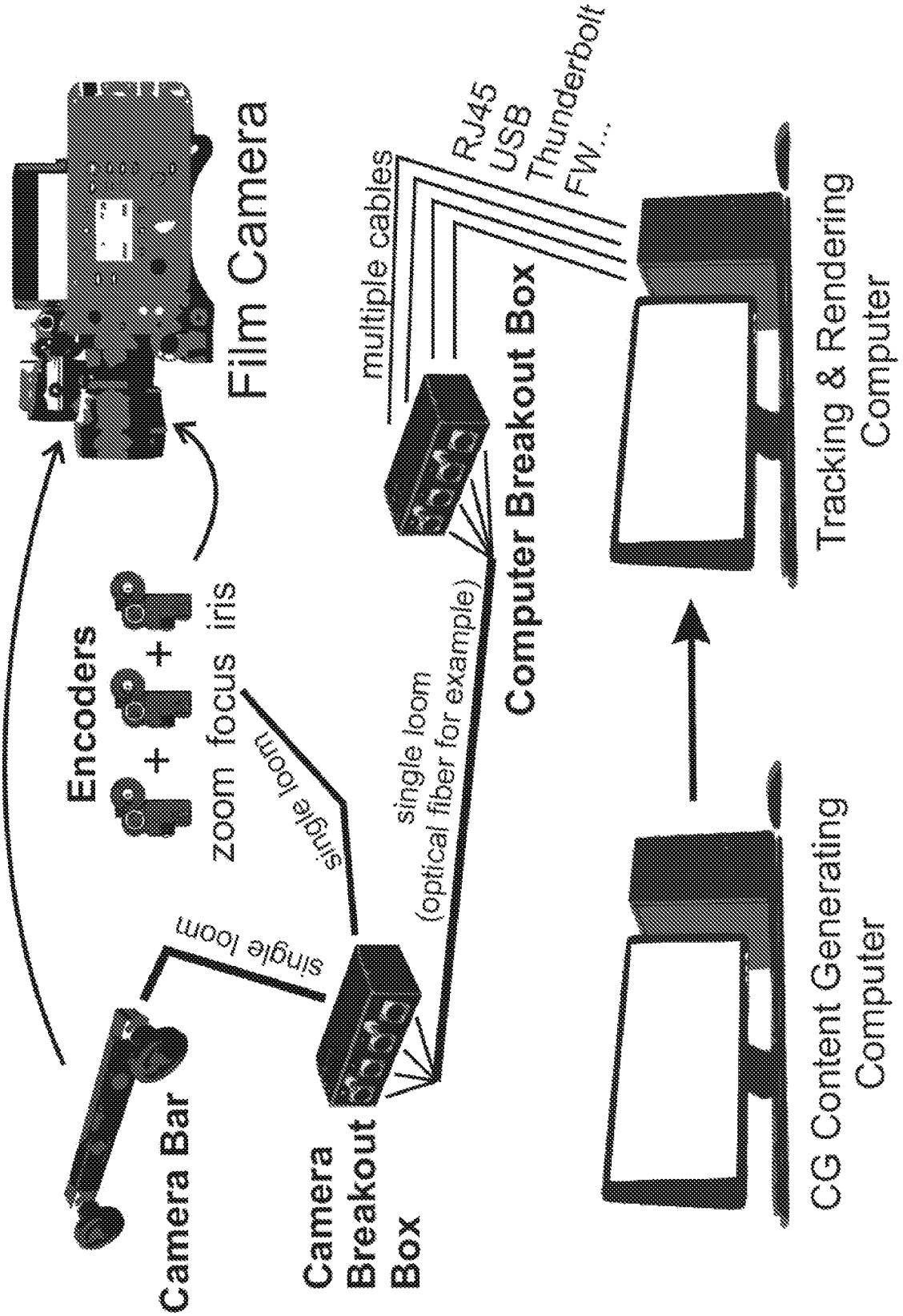
Film Camera
Encoders
zoom focus iris
single loom
single loom
Camera Bar
Camera Breakout Box
single loom
(optical fiber for example)
multiple cables
RJ45
USB
Thunderbolt
FW...
Computer Breakout Box
Tracking & Rendering Computer
CG Content Generating Computer

Figure 1

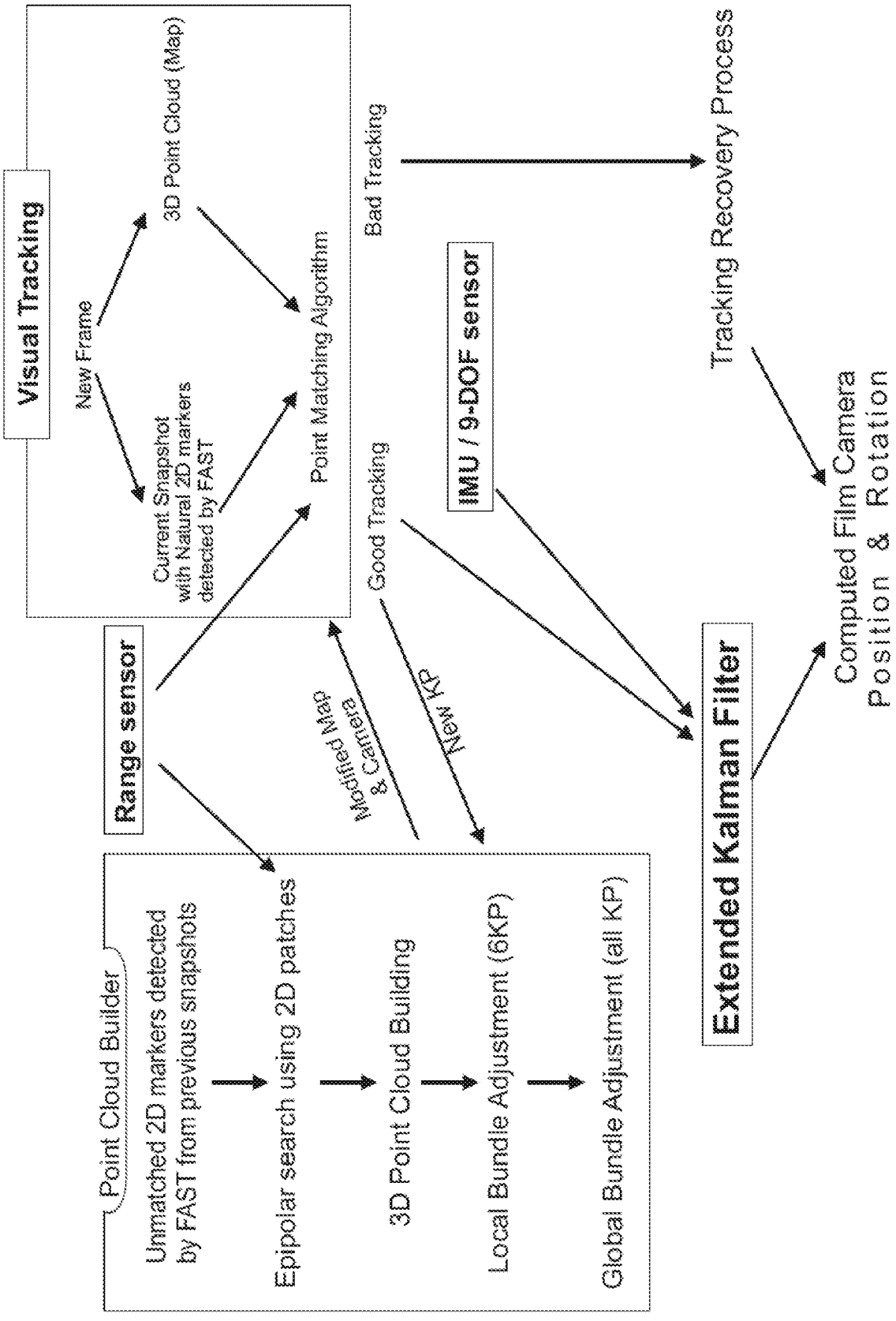
Visual Tracking
New Frame
3D Point Cloud (Map)
Current Snapshot with Natural 2D markers detected by FAST
Point Matching Algorithm
Bad Tracking
Tracking Recovery Process
IMU / 9-DOF sensor
Range sensor
Good Tracking
Modified Map & Camera
New KP
Extended Kalman Filter
Computed Film Camera Position & Rotation
Point Cloud Builder
Unmatched 2D markers detected by FAST from previous snapshots
Epipolar search using 2D patches
3D Point Cloud Building
Local Bundle Adjustment (6KP)
Global Bundle Adjustment (all KP)

Figure 2

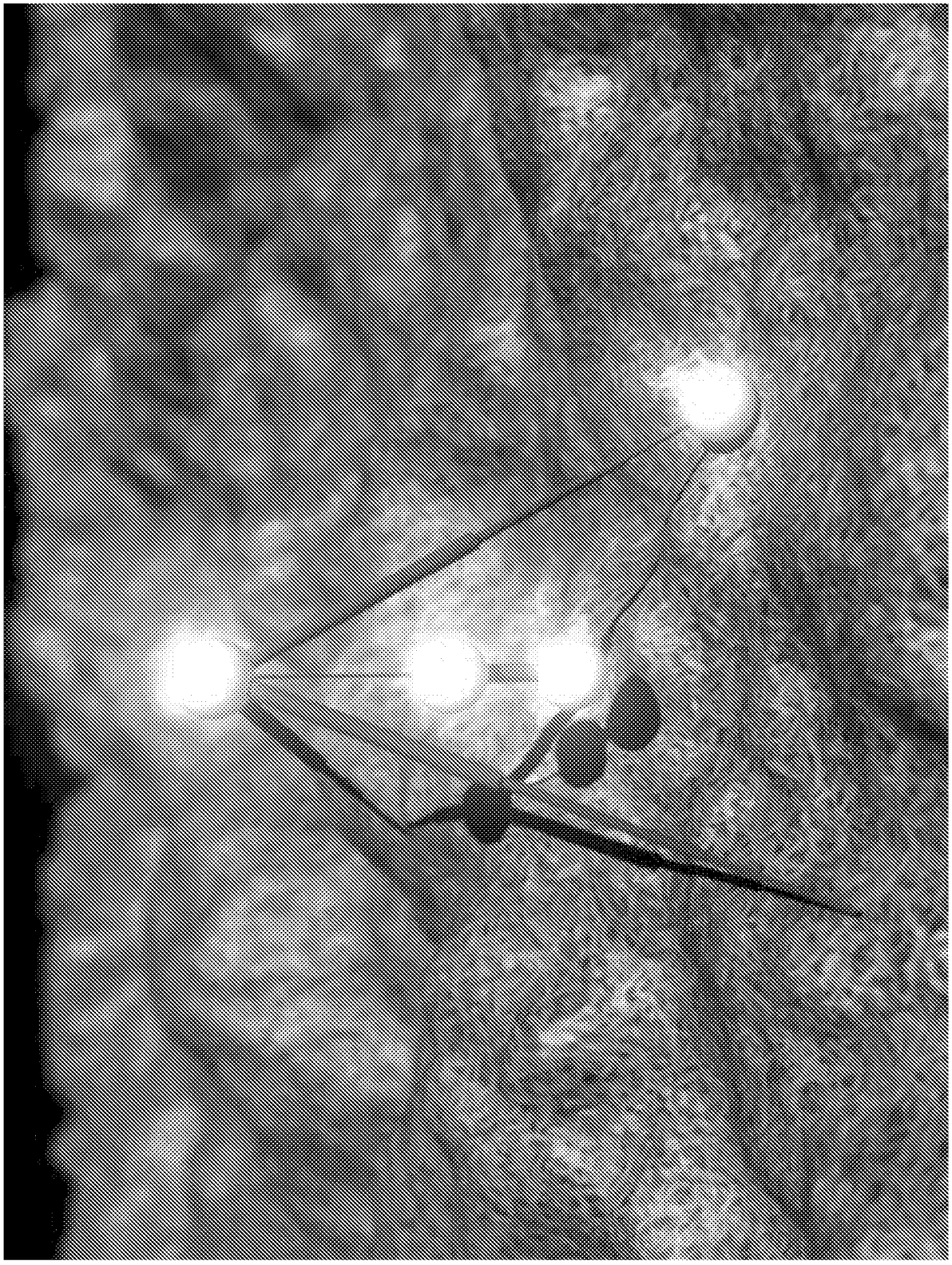

Figure 3

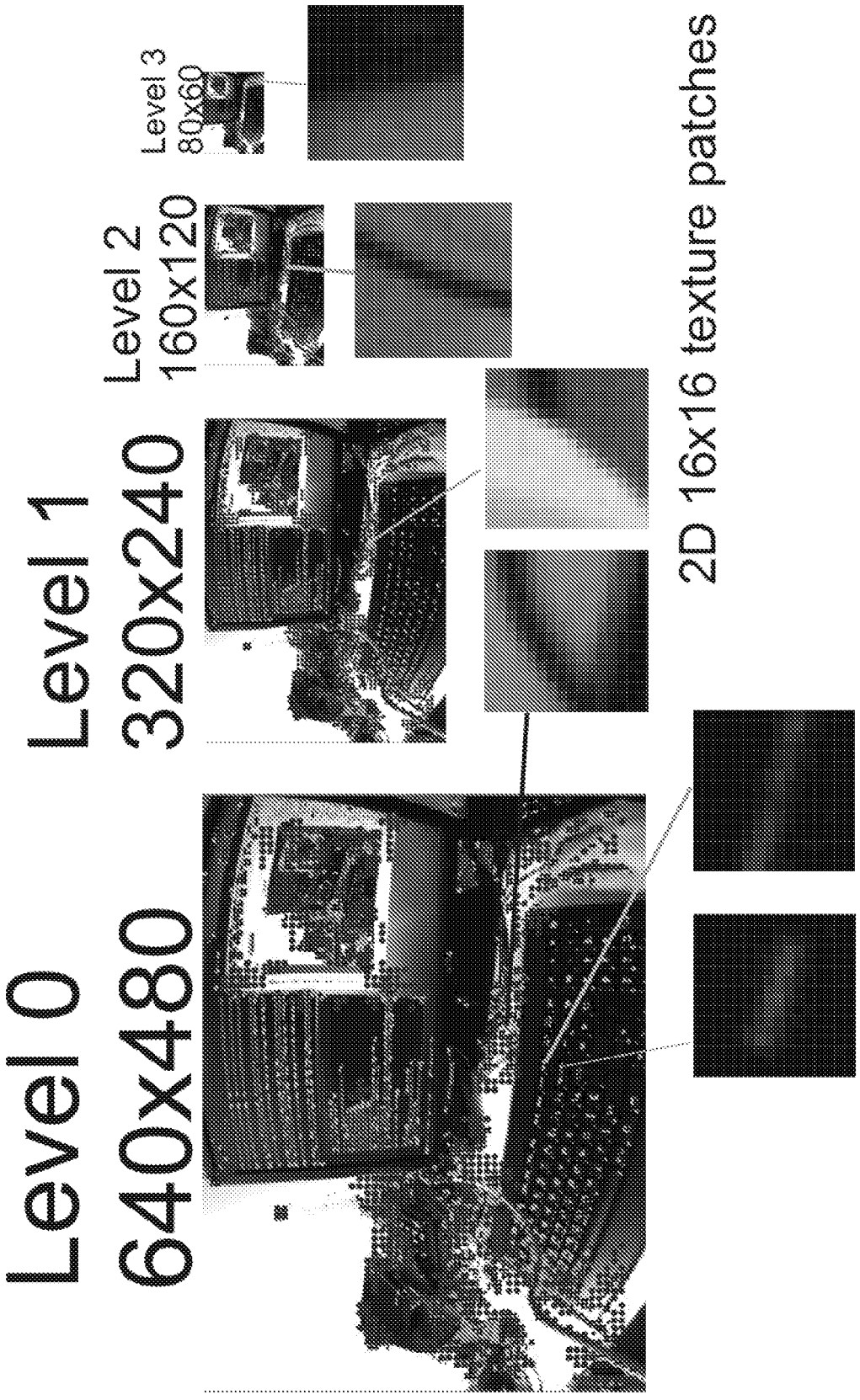
Level 0
640x480
Level 1
320x240
Level 2
160x120
Level 3
80x60
2D 16x16 texture patches

Figure 4

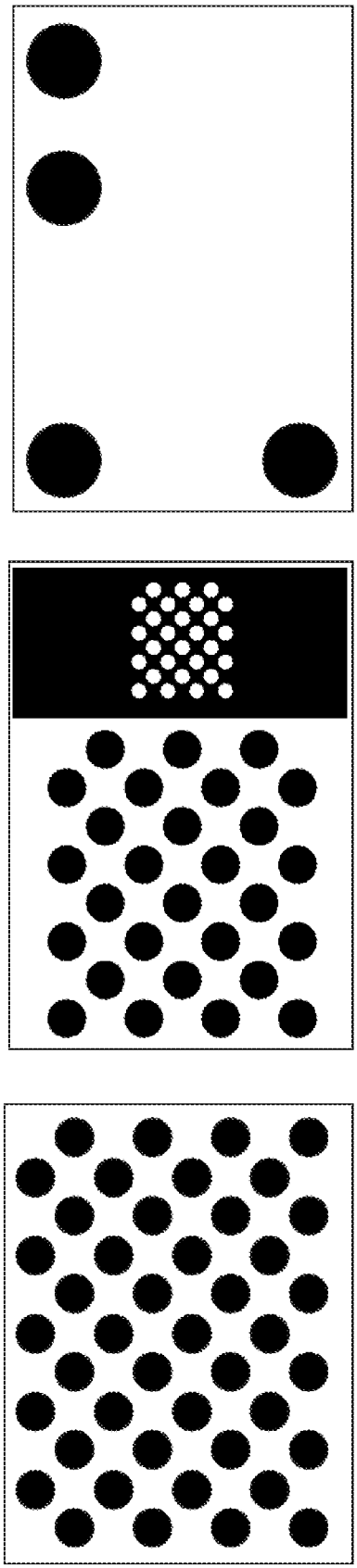

Figure 5

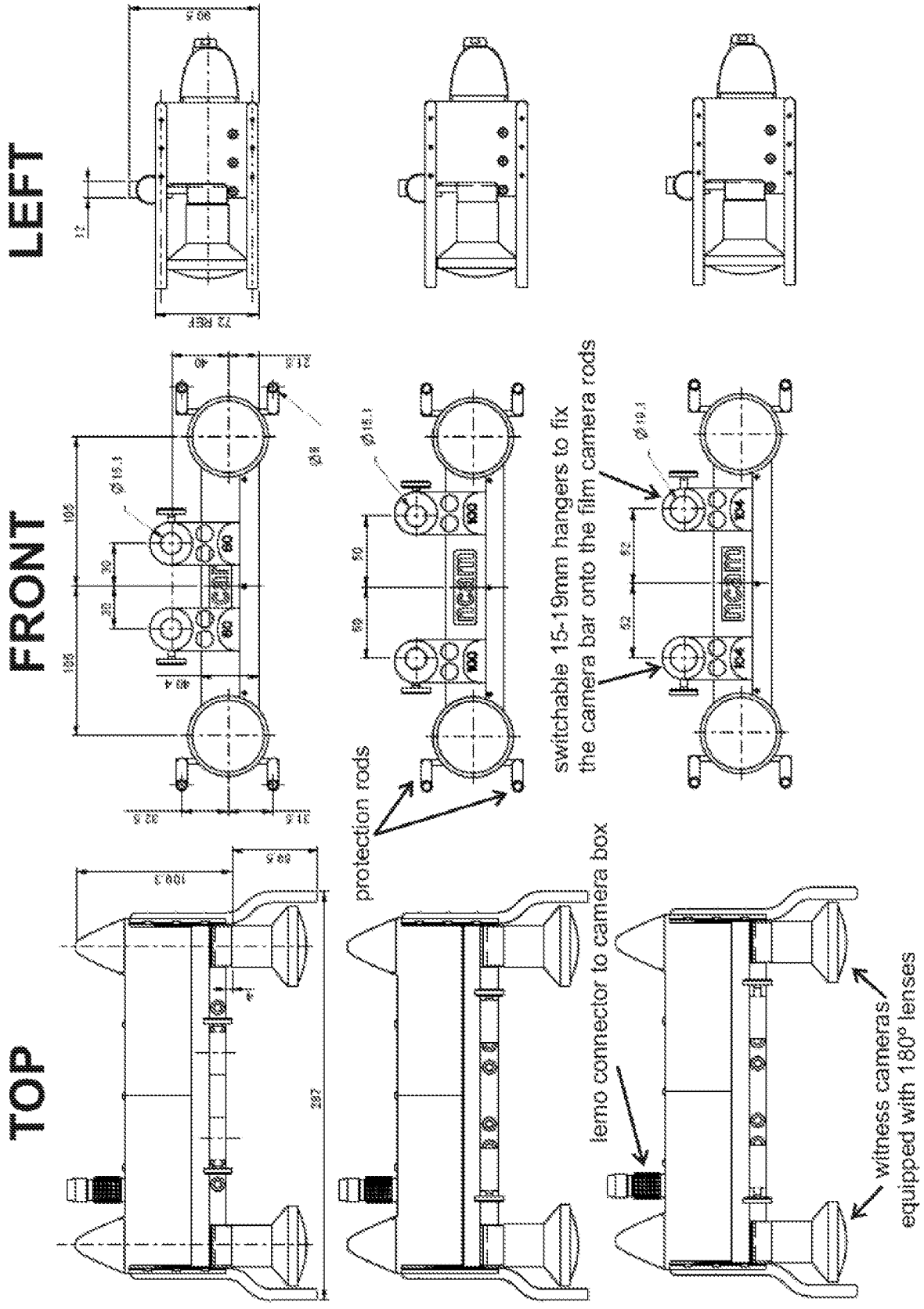
LEFT
FRONT
TOP
protection rods
switchable 15-19mm hangers to fix
the camera bar onto the film camera rods
lemo connector to camera box
witness cameras
equipped with 180° lenses

Figure 6

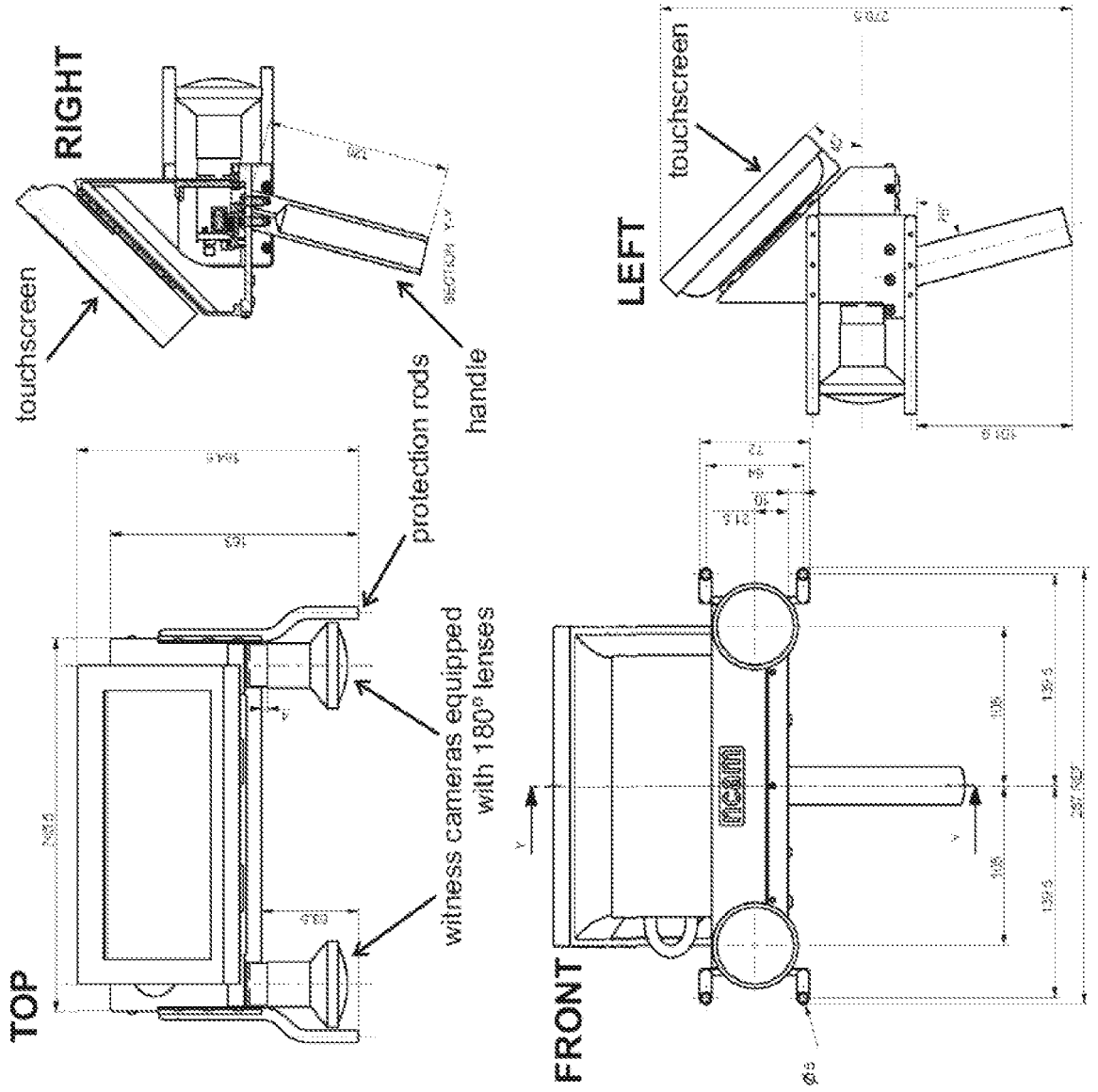
RIGHT
touchscreen
handle
protection rods
witness cameras equipped with 180° lenses
TOP
LEFT
touchscreen
FRONT

Figure 7

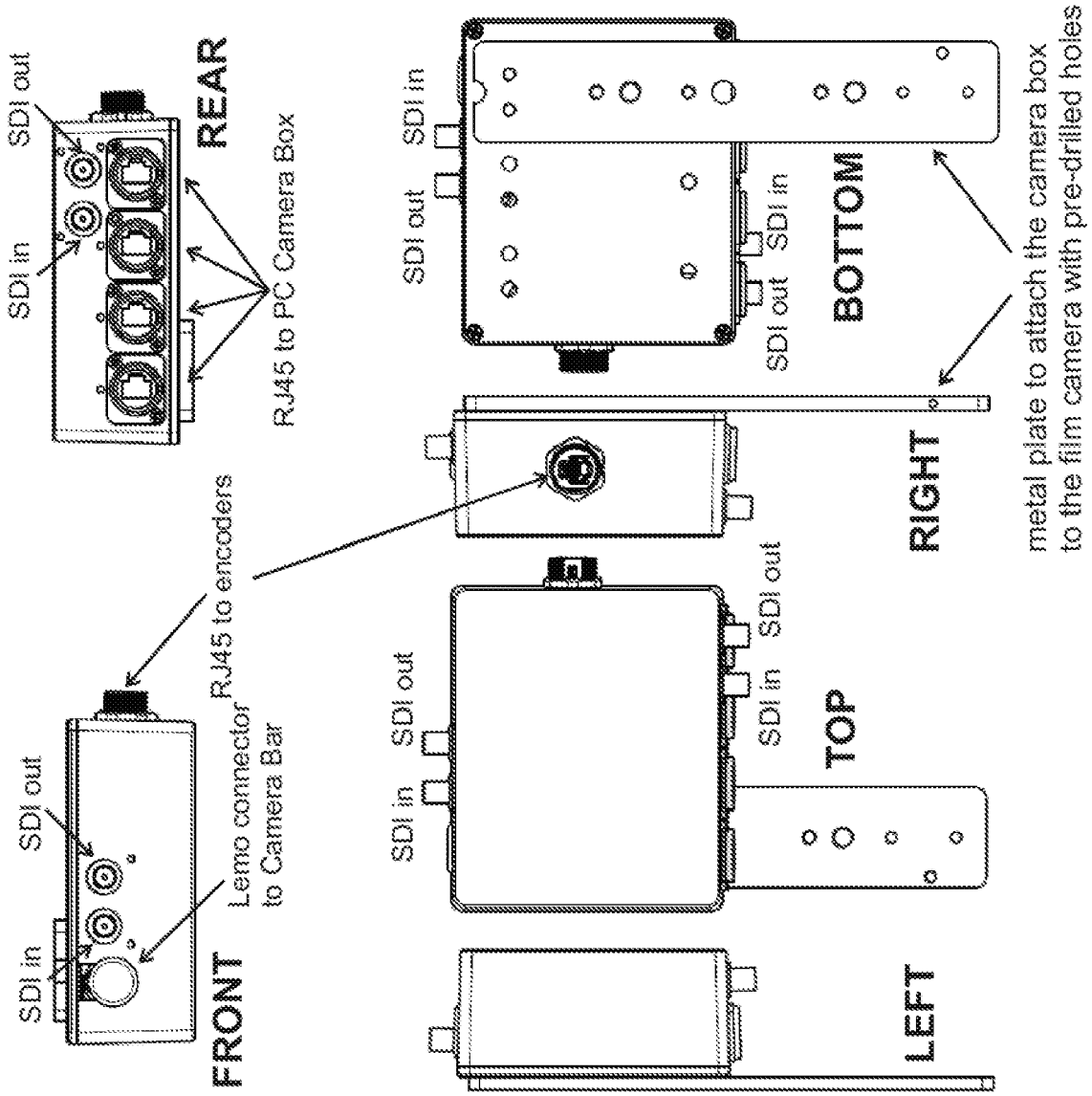
SDI out
SDI in
REAR
RJ45 to PC Camera Box
SDI out
SDI in
BOTTOM
SDI out
SDI in
RJ45 to encoders
Lemo connector
to Camera Bar
SDI out
SDI in
FRONT
SDI in
SDI out
TOP
SDI out
SDI in
RIGHT
LEFT
metal plate to attach the camera box
to the film camera with pre-drilled holes

Figure 8