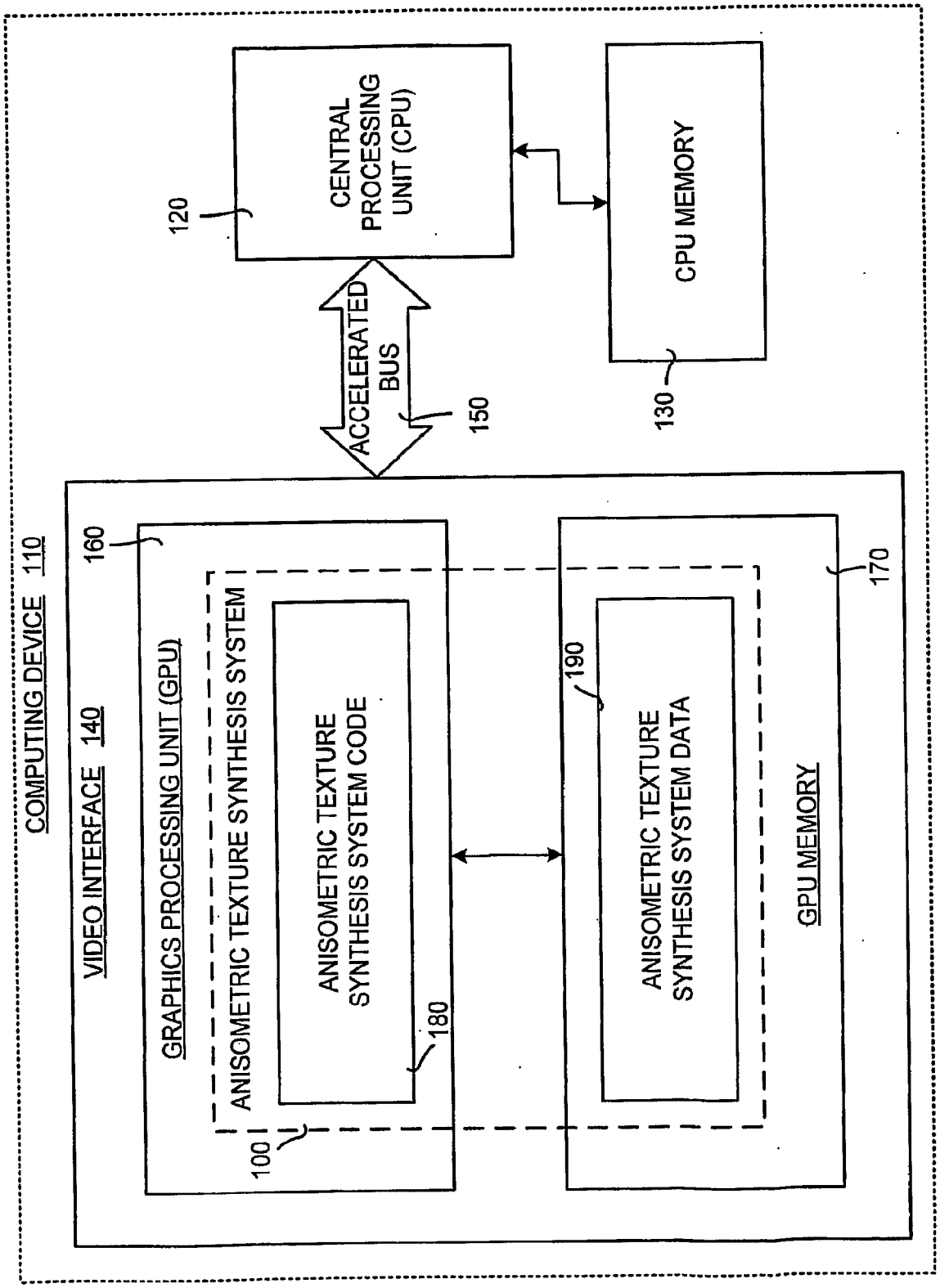
COMPUTING DEVICE 110
VIDEO INTERFACE 140
GRAPHICS PROCESSING UNIT (GPU)
160
ANISOMETRIC TEXTURE SYNTHESIS SYSTEM
100
ANISOMETRIC TEXTURE SYNTHESIS SYSTEM CODE
180
GPU MEMORY
170
190
ANISOMETRIC TEXTURE SYNTHESIS SYSTEM DATA
ACCELERATED BUS
150
CENTRAL PROCESSING UNIT (CPU)
120
CPU MEMORY
130

FIG. 1

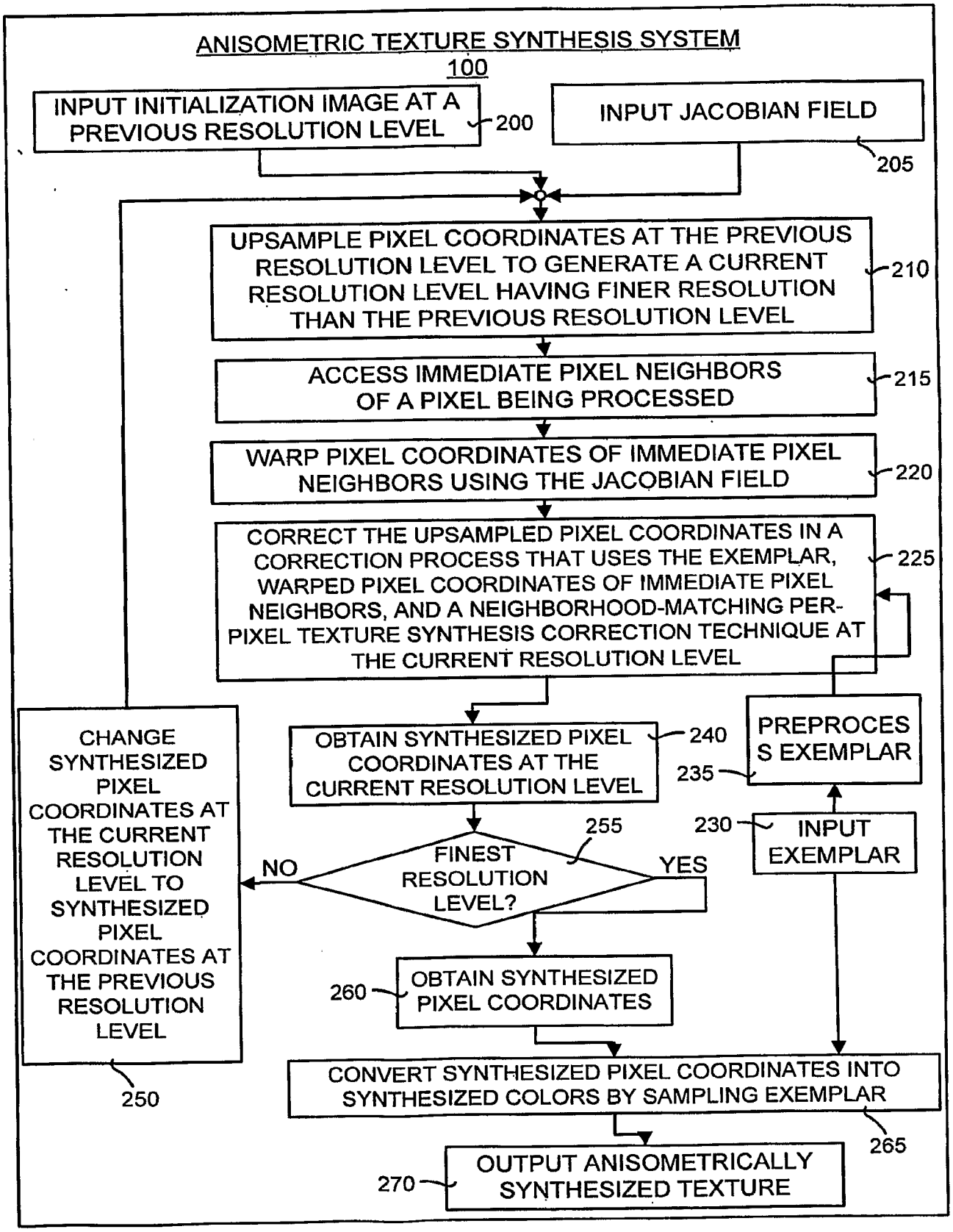
ANISOMETRIC TEXTURE SYNTHESIS SYSTEM
100
INPUT INITIALIZATION IMAGE AT A PREVIOUS RESOLUTION LEVEL
200
INPUT JACOBIAN FIELD
205
UPSAMPLE PIXEL COORDINATES AT THE PREVIOUS RESOLUTION LEVEL TO GENERATE A CURRENT RESOLUTION LEVEL HAVING FINER RESOLUTION THAN THE PREVIOUS RESOLUTION LEVEL
210
ACCESS IMMEDIATE PIXEL NEIGHBORS OF A PIXEL BEING PROCESSED
215
WARP PIXEL COORDINATES OF IMMEDIATE PIXEL NEIGHBORS USING THE JACOBIAN FIELD
220
CORRECT THE UPSAMPLED PIXEL COORDINATES IN A CORRECTION PROCESS THAT USES THE EXEMPLAR, WARPED PIXEL COORDINATES OF IMMEDIATE PIXEL NEIGHBORS, AND A NEIGHBORHOOD-MATCHING PER-PIXEL TEXTURE SYNTHESIS CORRECTION TECHNIQUE AT THE CURRENT RESOLUTION LEVEL
225
CHANGE SYNTHESIZED PIXEL COORDINATES AT THE CURRENT RESOLUTION LEVEL TO SYNTHESIZED PIXEL COORDINATES AT THE PREVIOUS RESOLUTION LEVEL
250
OBTAIN SYNTHESIZED PIXEL COORDINATES AT THE CURRENT RESOLUTION LEVEL
240
PREPROCESS EXEMPLAR
235
INPUT EXEMPLAR
230
FINEST RESOLUTION LEVEL?
255
NO
YES
OBTAIN SYNTHESIZED PIXEL COORDINATES
260
CONVERT SYNTHESIZED PIXEL COORDINATES INTO SYNTHESIZED COLORS BY SAMPLING EXEMPLAR
265
OUTPUT ANISOMETRICALLY SYNTHESIZED TEXTURE
270

FIG. 2

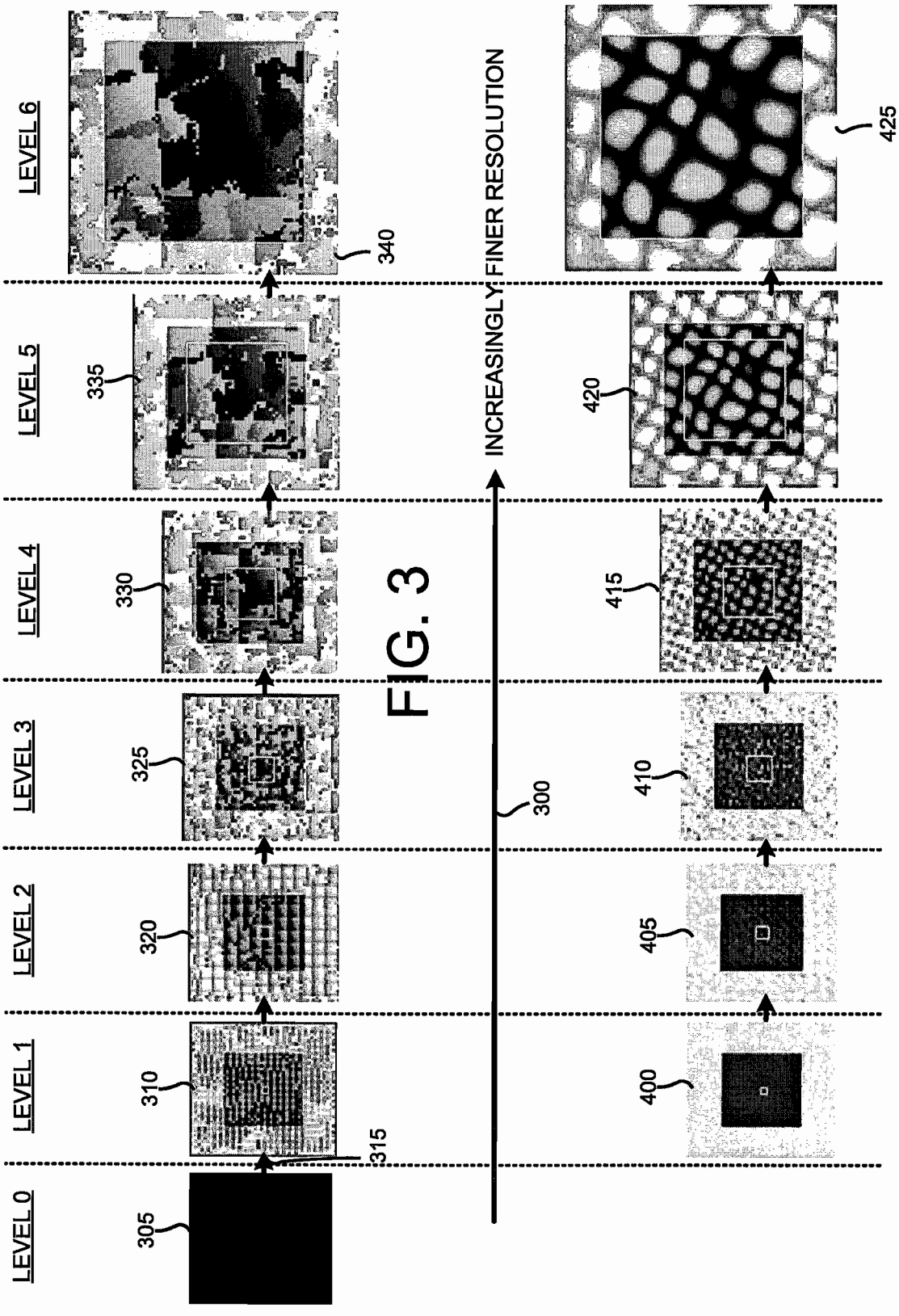
LEVEL 0
LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4
LEVEL 5
LEVEL 6
INCREASINGLY FINER RESOLUTION
300
305
310
315
320
325
330
335
340
400
405
410
415
420
425

FIG. 3

FIG. 4

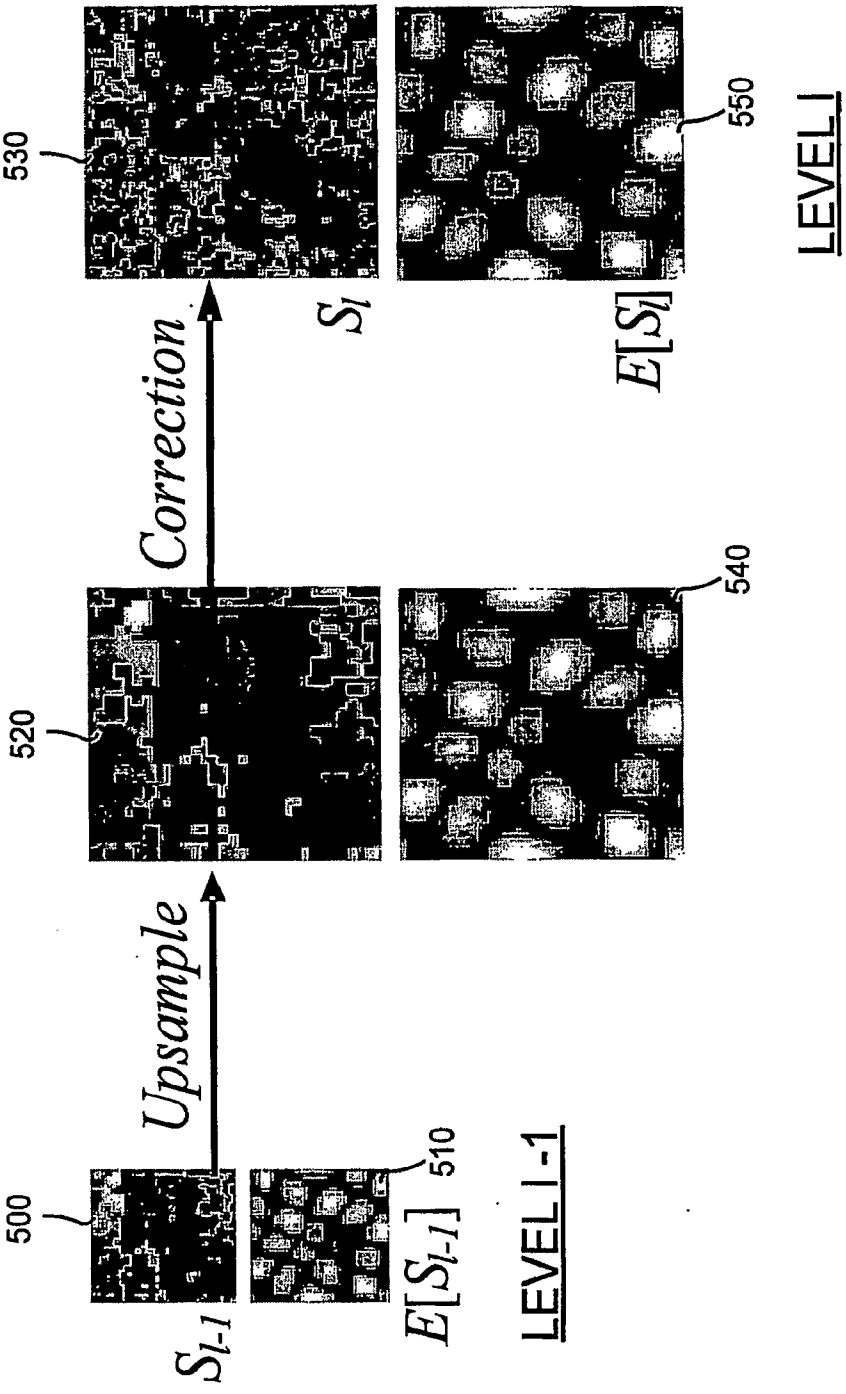
500
510
520
530
540
550
Upsample
Correction
S_{l-1}
$E[S_{l-1}]$
S_l
$E[S_l]$
LEVEL l -1
LEVEL l

FIG. 5

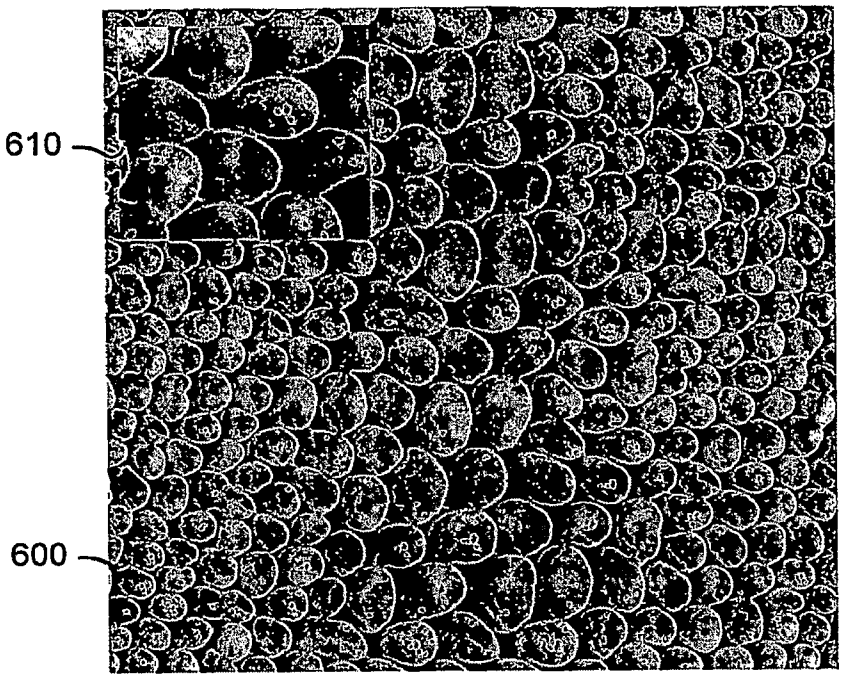

FIG. 6

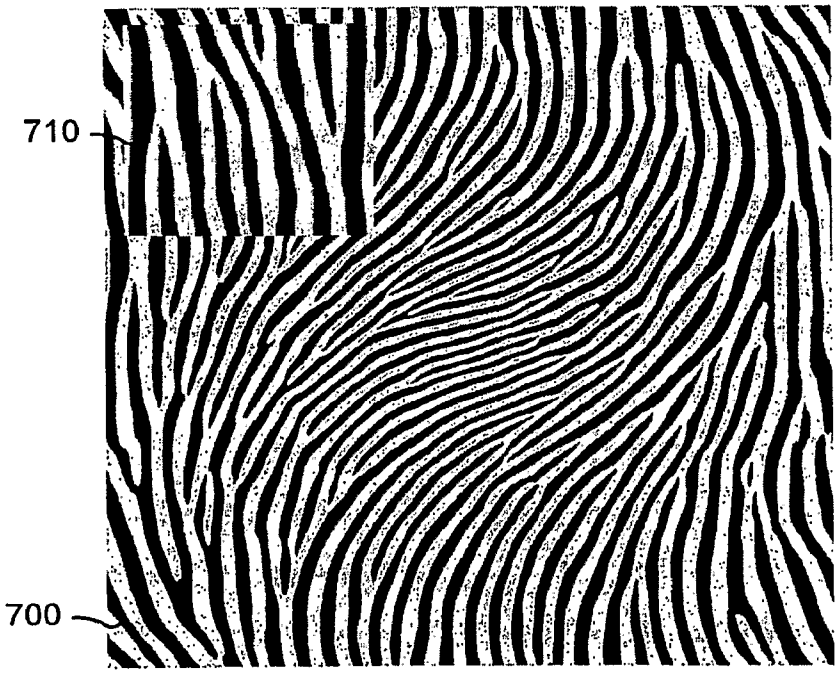

FIG. 7

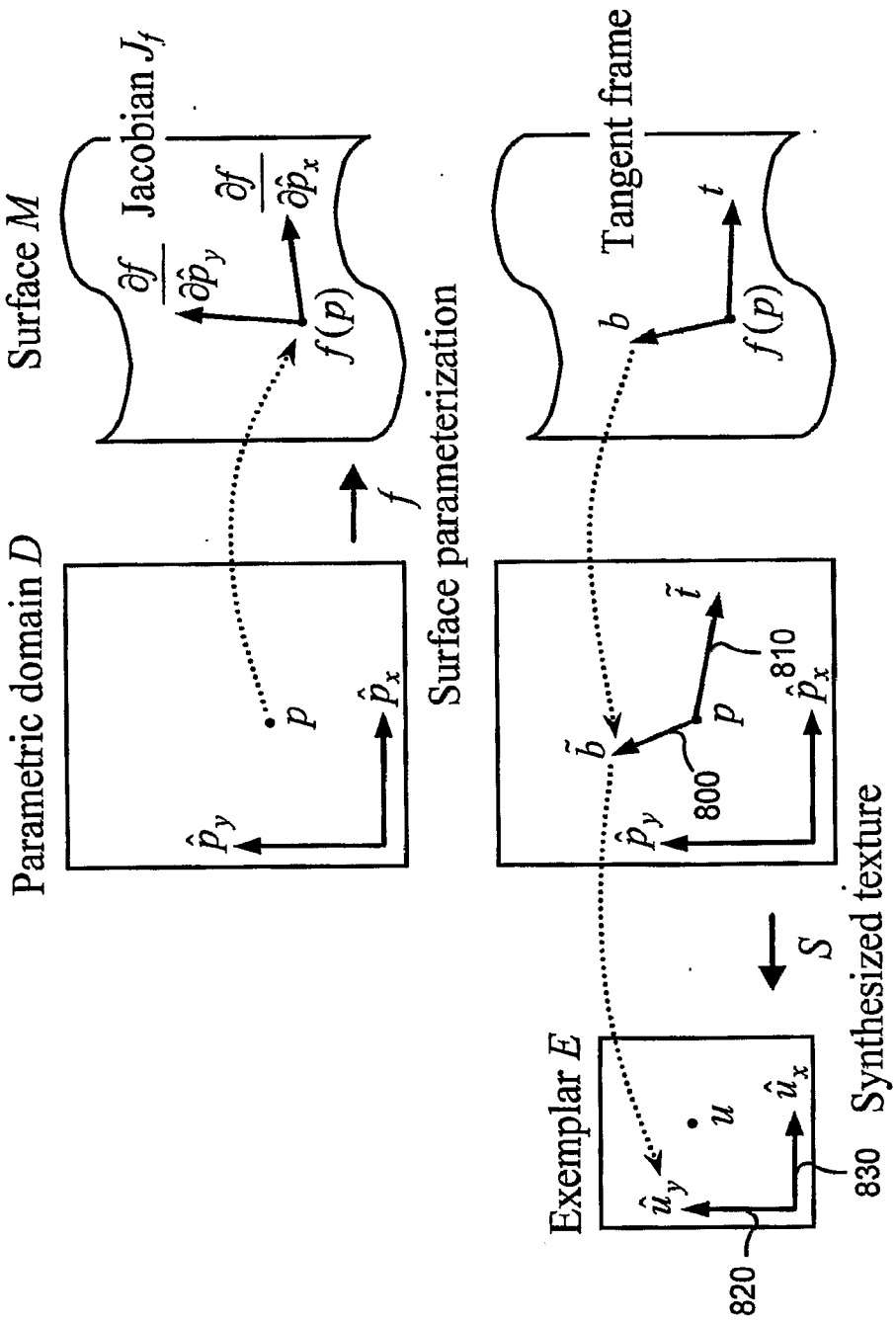
Surface M
Jacobian J_f
$\frac{\partial f}{\partial \hat{p}_y}$
$\frac{\partial f}{\partial \hat{p}_x}$
$f(p)$
Parametric domain D
$\hat{p}_y$
p
$\hat{p}_x$
f
Surface parameterization
Tangent frame
b
t
$f(p)$
$\tilde{b}$
$\tilde{t}$
800
p
810
$\hat{p}_x$
$\hat{p}_y$
S
Exemplar E
$\hat{u}_y$
u
$\hat{u}_x$
820
830
Synthesized texture

FIG. 8

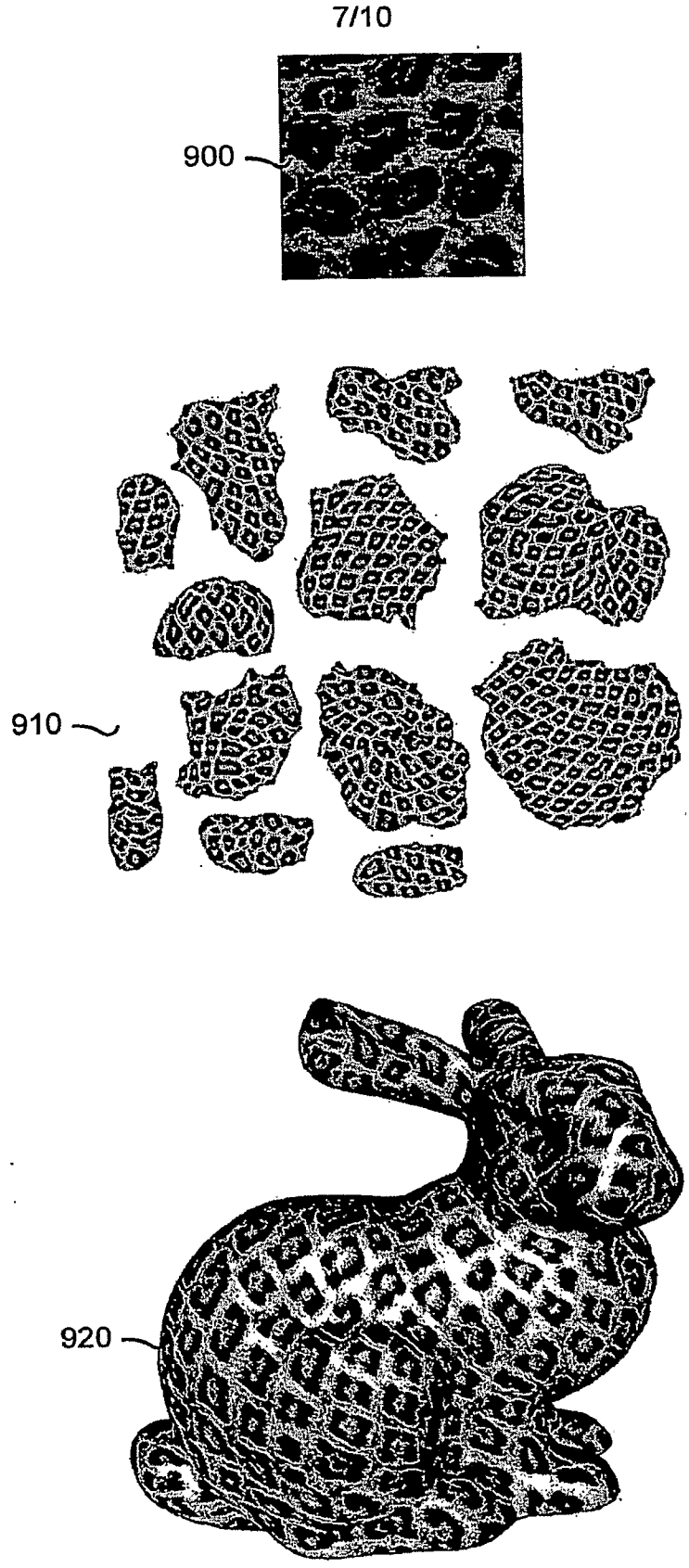

FIG. 9



FIG. 10

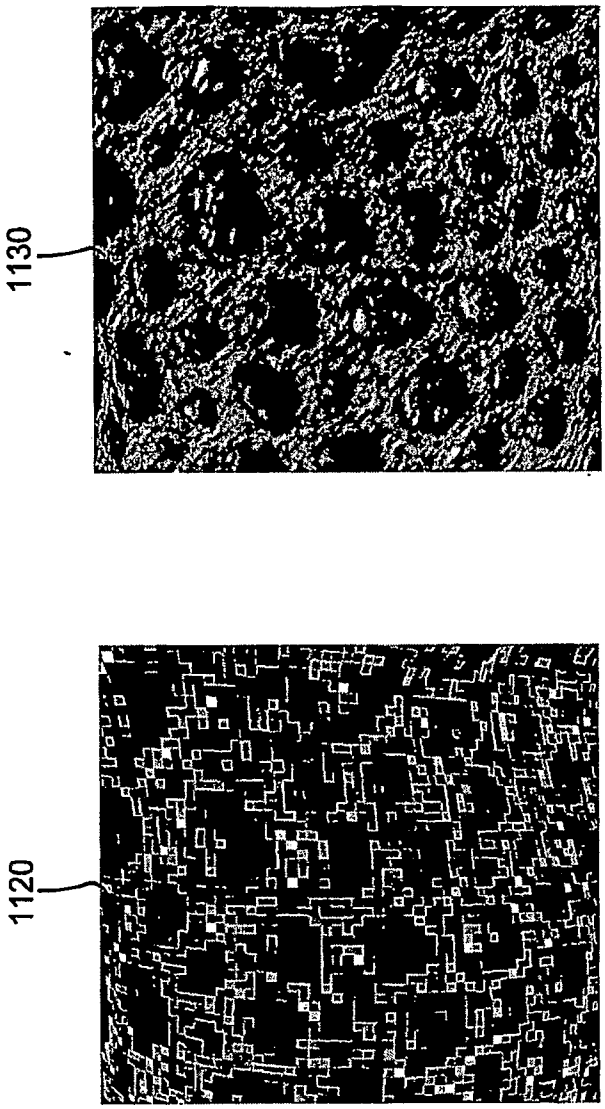

FIG. 11

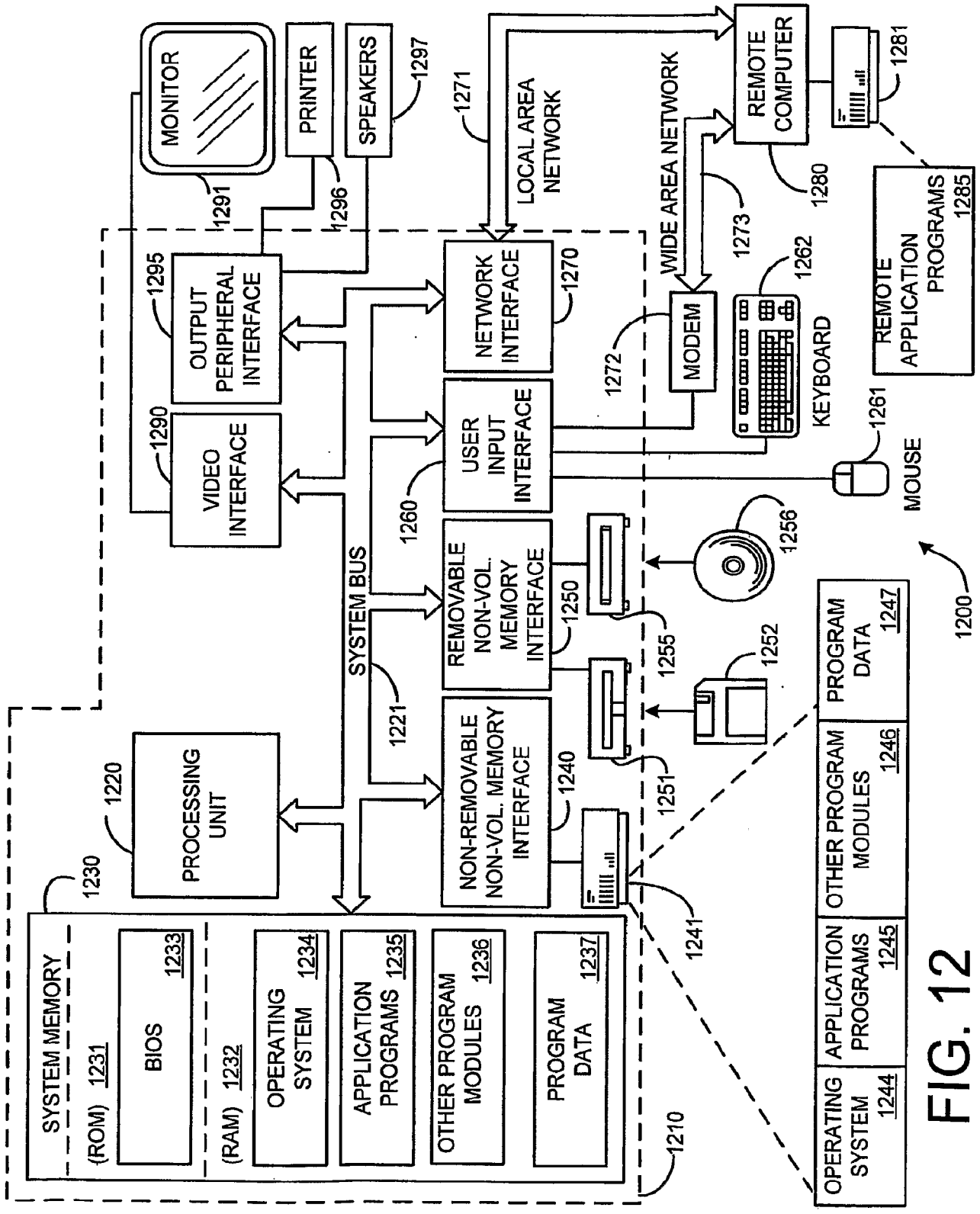
MONITOR
1291
PRINTER
1296
SPEAKERS
1297
1271
LOCAL AREA NETWORK
WIDE AREA NETWORK
REMOTE COMPUTER
1280
1281
1295
OUTPUT PERIPHERAL INTERFACE
NETWORK INTERFACE
1270
1273
1262
REMOTE APPLICATION PROGRAMS
1285
1290
VIDEO INTERFACE
1272
MODEM
KEYBOARD
1261
USER INPUT INTERFACE
1260
MOUSE
SYSTEM BUS
1256
1250
REMOVABLE NON-VOL. MEMORY INTERFACE
1255
1252
1200
1220
PROCESSING UNIT
1221
1240
NON-REMOVABLE NON-VOL. MEMORY INTERFACE
1251
PROGRAM DATA
1247
OTHER PROGRAM MODULES
1246
1230
SYSTEM MEMORY
(ROM) 1231
BIOS
1233
(RAM) 1232
OPERATING SYSTEM
1234
APPLICATION PROGRAMS
1235
OTHER PROGRAM MODULES
1236
PROGRAM DATA
1237
1241
APPLICATION PROGRAMS
1245
OPERATING SYSTEM
1244
1210

FIG. 12