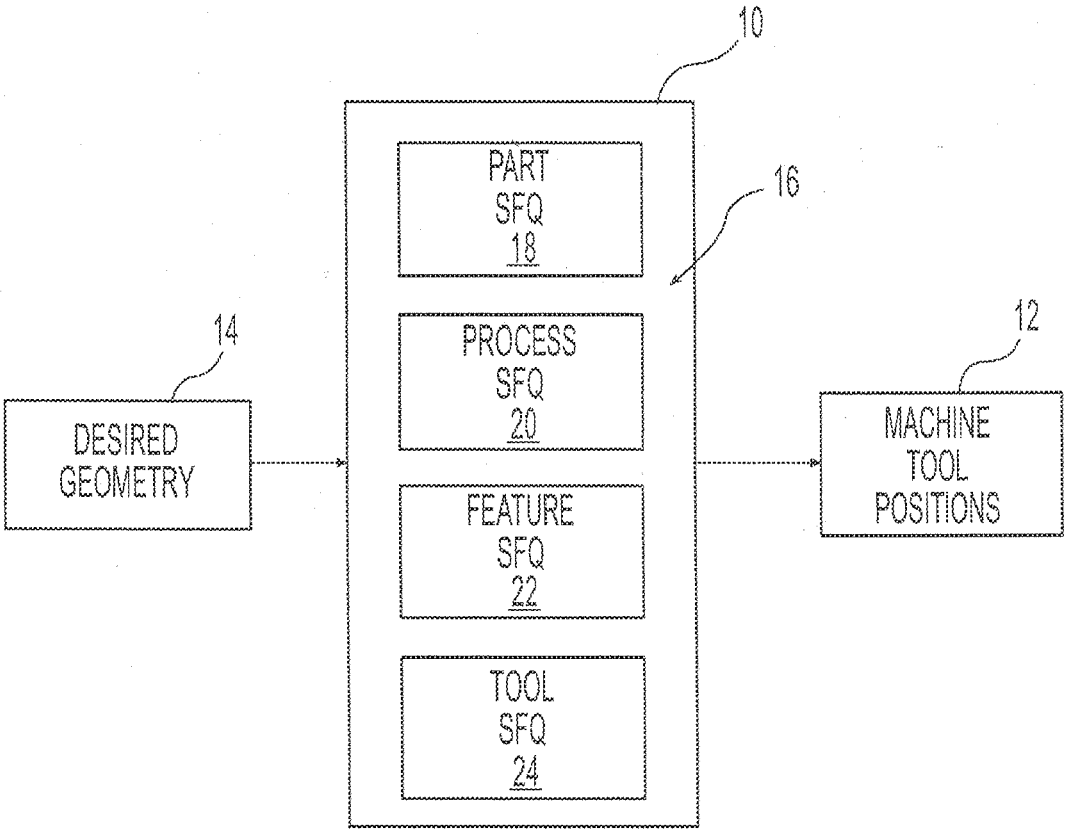

10
PART SFQ 18
16
PROCESS SFQ 20
FEATURE SFQ 22
TOOL SFQ 24
14
DESIRED GEOMETRY
12
MACHINE TOOL POSITIONS

Fig. 1

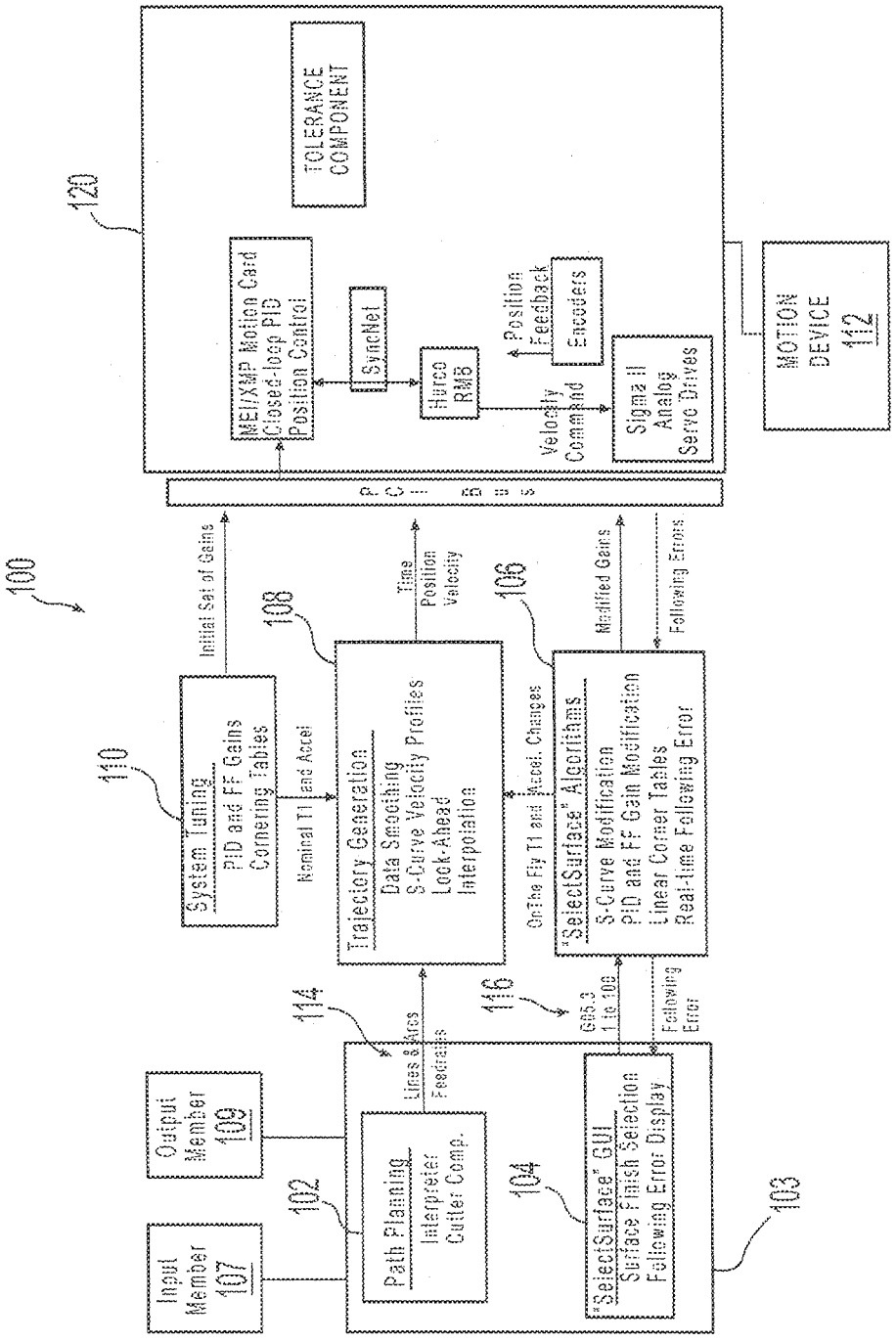

100
120
TOLERANCE COMPONENT
MEI/XMP Motion Card Closed-loop PID Position Control
SyncNet
Hurco RMB
Position Feedback
Encoders
Velocity Command
Sigma II Analog Servo Drives
MOTION DEVICE 112
PCI Bus
Initial Set of Gains
108
Time
Position
Velocity
106
Modified Gains
Following Errors
110
System Tuning
PID and FF Gains
Cornering Tables
Nominal T1 and Accel
Trajectory Generation
Data Smoothing
S-Curve Velocity Profiles
Look-Ahead
Interpolation
On The Fly T1 and Accel. Changes
"SelectSurface" Algorithms
S-Curve Modification
PID and FF Gain Modification
Linear Corner Tables
Real-time Following Error
114
116
G05.3
1 to 100
Following Error
Lines & Arcs
Feedrates
Output Member 109
Input Member 107
102
Path Planning
Interpreter
Cutter Comp.
104
"SelectSurface" GUI
Surface Finish Selection
Following Error Display
103

Fig. 2

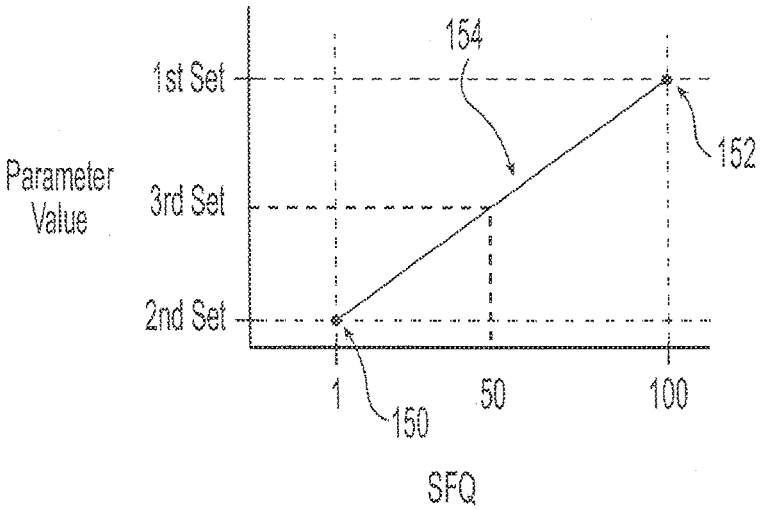

154
1st Set
152
Parameter Value
3rd Set
2nd Set
1
50
100
150
SFQ

Fig. 3

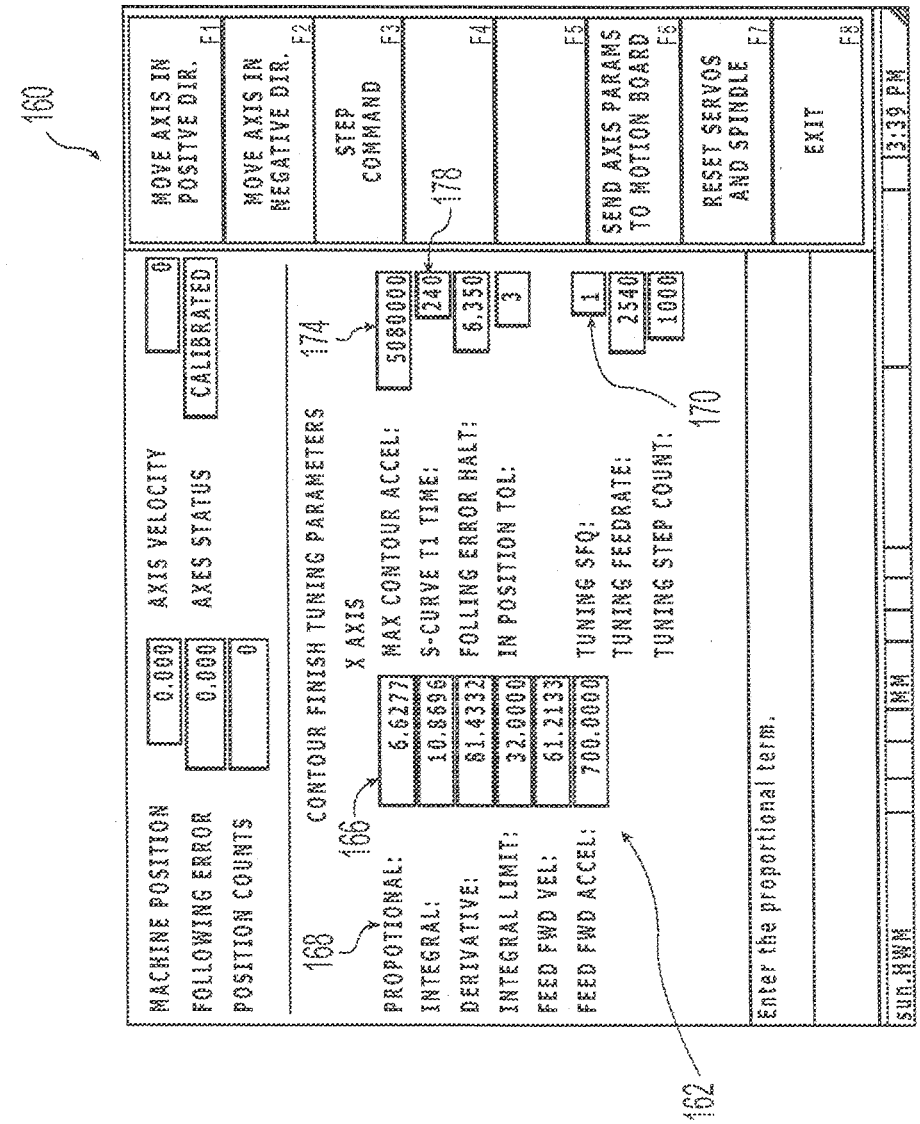

160
MOVE AXIS IN POSITIVE DIR. F1
MOVE AXIS IN NEGATIVE DIR. F2
STEP COMMAND F3
F4
F5
SEND AXIS PARAMS TO MOTION BOARD F6
RESET SERVOS AND SPINDLE F7
EXIT F8
MACHINE POSITION
FOLLOWING ERROR
POSITION COUNTS
0.000
0.000
0
AXIS VELOCITY
AXES STATUS
0
CALIBRATED
168
CONTOUR FINISH TUNING PARAMETERS
X AXIS
166
PROPORTIONAL:
INTEGRAL:
DERIVATIVE:
INTEGRAL LIMIT:
FEED FWD VEL:
FEED FWD ACCEL:
6.6277
10.8696
61.4332
32.0000
61.2133
700.0000
MAX CONTOUR ACCEL:
S-CURVE T1 TIME:
FOLLING ERROR HALT:
IN POSITION TOL:
TUNING SEQ:
TUNING FEEDRATE:
TUNING STEP COUNT:
5080000
240
6.350
3
1
2540
1000
174
178
170
162
Enter the proportional term.
NUM
3:39 PM

Fig. 4

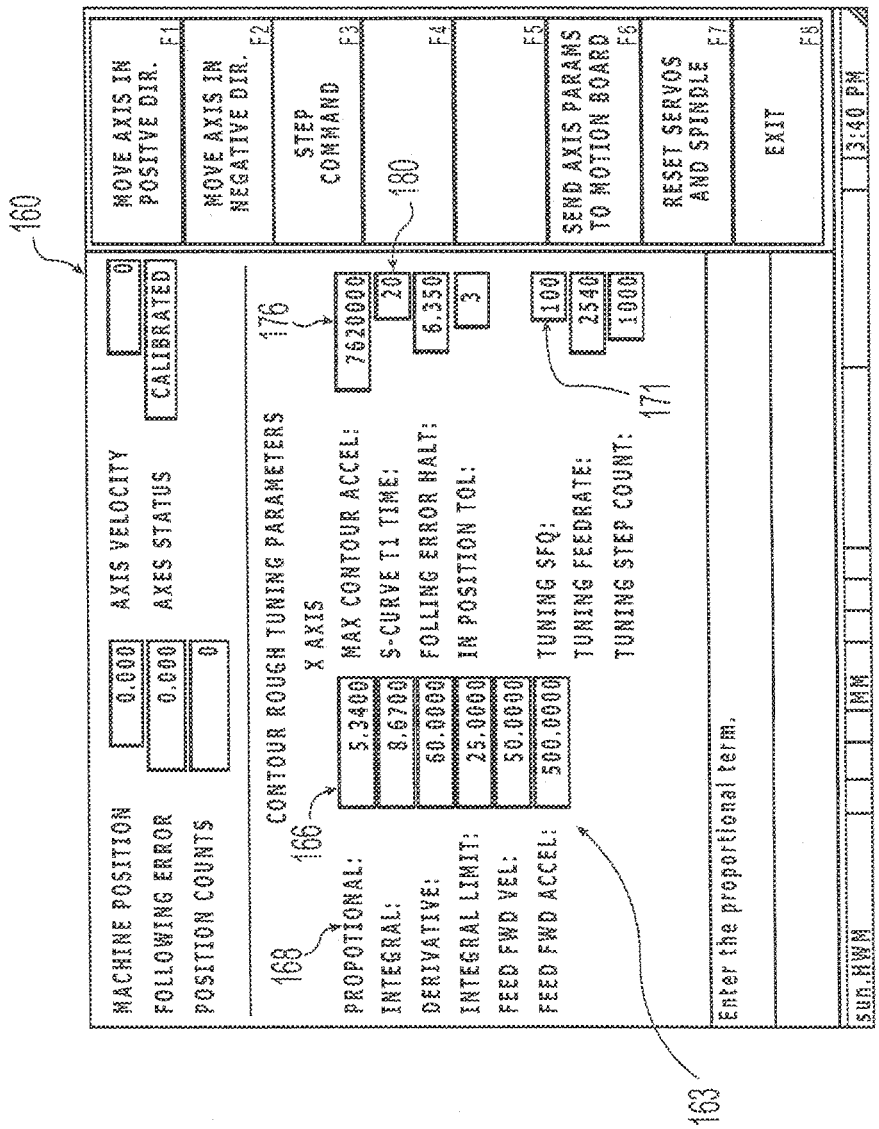

160
MACHINE POSITION
FOLLOWING ERROR
POSITION COUNTS
0.000
0.000
0
AXIS VELOCITY
AXES STATUS
0
CALIBRATED
MOVE AXIS IN POSITIVE DIR. F1
MOVE AXIS IN NEGATIVE DIR. F2
STEP COMMAND F3
F4
F5
SEND AXIS PARAMS TO MOTION BOARD F6
RESET SERVOS AND SPINDLE F7
EXIT F8
180
CONTOUR ROUGH TUNING PARAMETERS
X AXIS
176
166
168
PROPOTIONAL:
INTEGRAL:
DERIVATIVE:
INTEGRAL LIMIT:
FEED FWD VEL:
FEED FWD ACCEL:
5.3400
8.6700
60.0000
25.0000
50.0000
500.0000
MAX CONTOUR ACCEL:
S-CURVE T1 TIME:
FOLLING ERROR HALT:
IN POSITION TOL:
TUNING SFO:
TUNING FEEDRATE:
TUNING STEP COUNT:
7620000
20
6.350
3
100
2540
1000
171
163
Enter the proportional term.
sun.HWM
MM
13:40 PM

Fig. 5

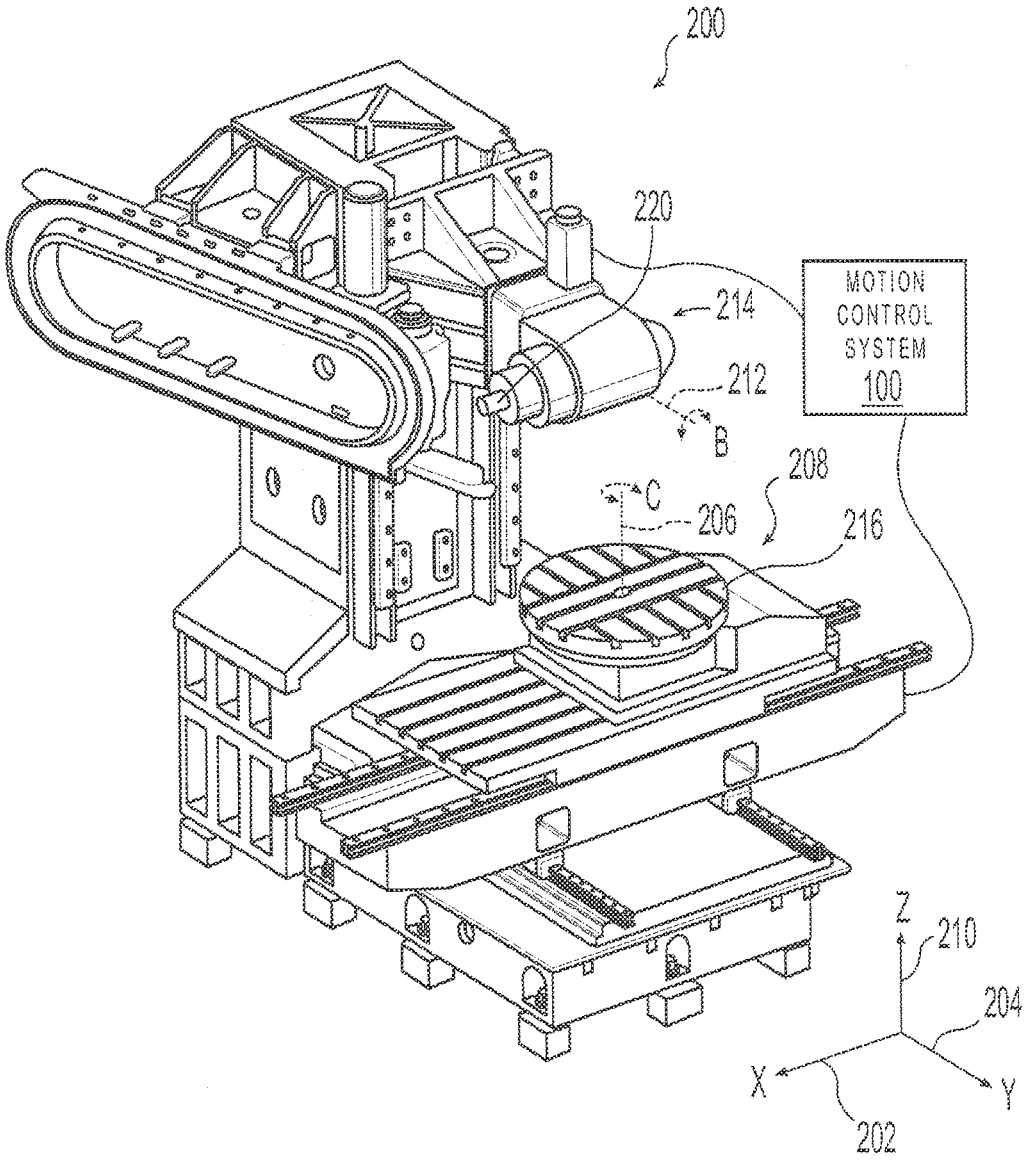

200
220
214
212
B
MOTION CONTROL SYSTEM 100
208
C
206
216
Z
210
204
X
Y
202

Fig. 6

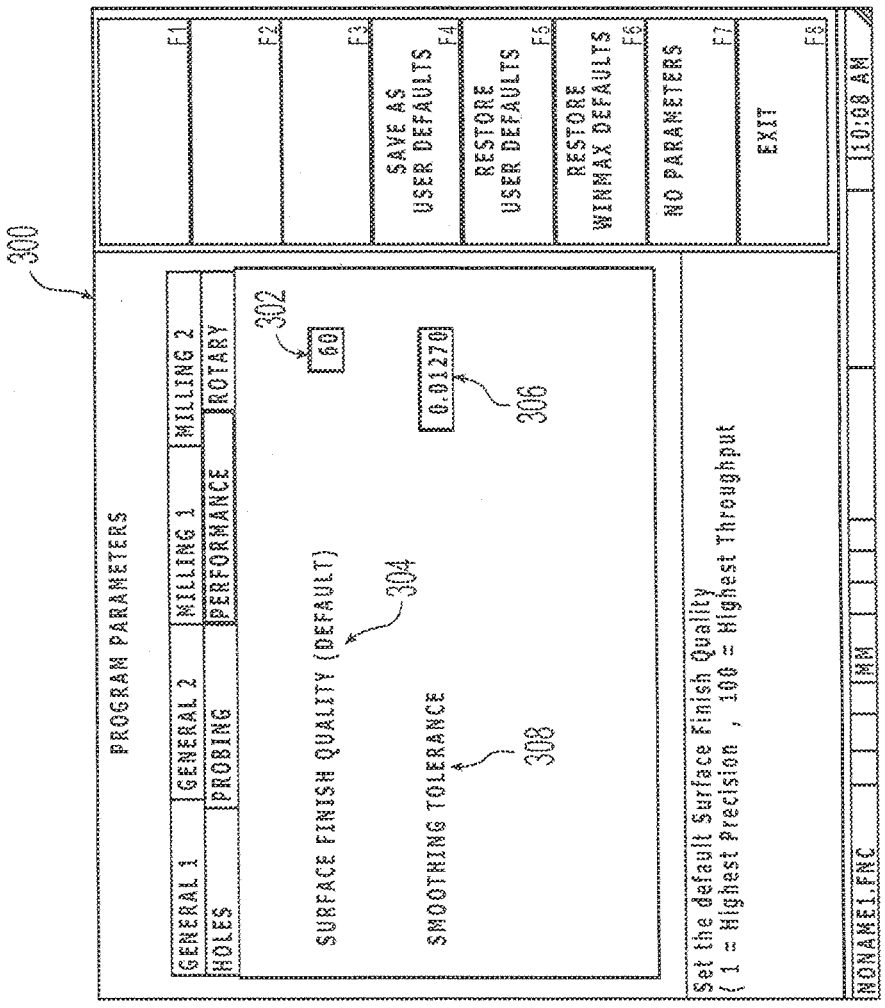

300
PROGRAM PARAMETERS
GENERAL 1
GENERAL 2
MILLING 1
MILLING 2
HOLES
PROBING
PERFORMANCE
ROTARY
302
60
SURFACE FINISH QUALITY (DEFAULT)
304
0.01270
306
SMOOTHING TOLERANCE
308
Set the default Surface Finish Quality
(1 = Highest Precision , 100 = Highest Throughput
F1
F2
F3
SAVE AS USER DEFAULTS
F4
RESTORE USER DEFAULTS
F5
RESTORE WINMAX DEFAULTS
F6
NO PARAMETERS
F7
EXIT
F8
10:08 AM
NONAME1.FNC
MM

Fig. 7

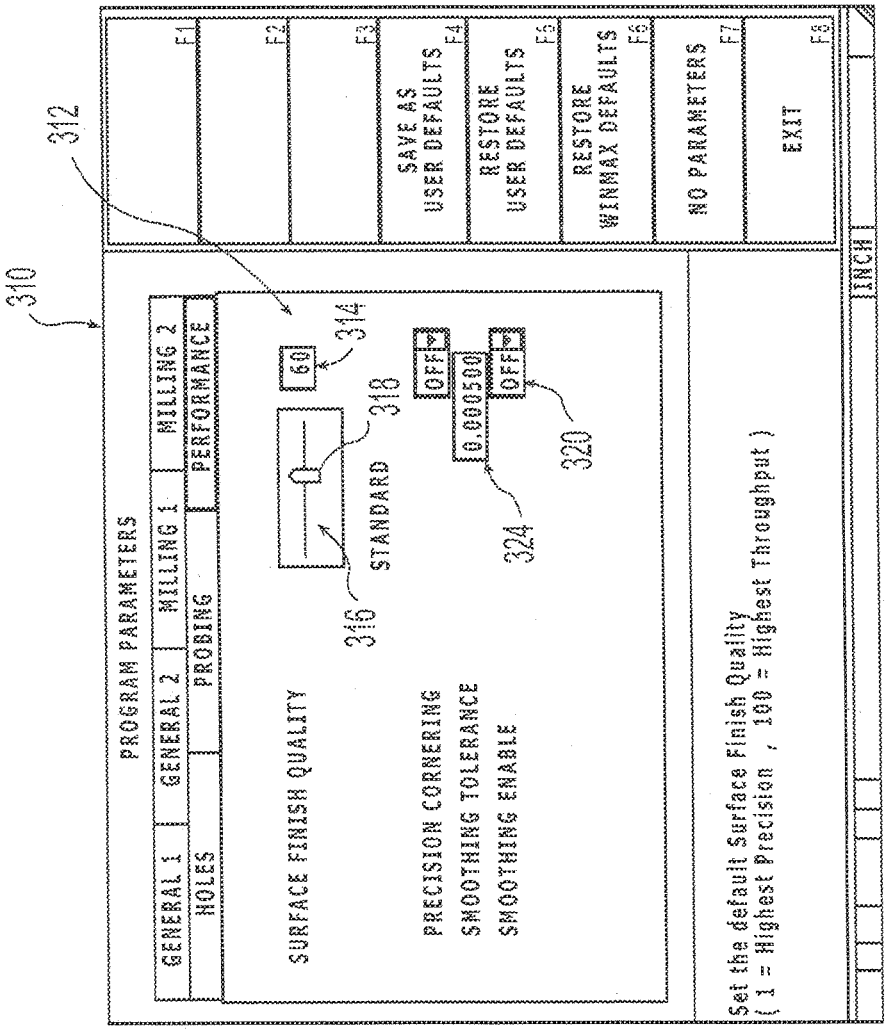

310
312
314
316
318
320
322
324
PROGRAM PARAMETERS
GENERAL 1
GENERAL 2
MILLING 1
MILLING 2
HOLES
PROBING
PERFORMANCE
SURFACE FINISH QUALITY
60
STANDARD
PRECISION CORNERING
OFF
SMOOTHING TOLERANCE
0.000500
SMOOTHING ENABLE
OFF
F1
F2
F3
SAVE AS USER DEFAULTS F4
RESTORE USER DEFAULTS F5
RESTORE WINMAX DEFAULTS F6
NO PARAMETERS F7
EXIT F8
INCH
Set the default Surface Finish Quality
(1 = Highest Precision , 100 = Highest Throughput)

Fig. 8

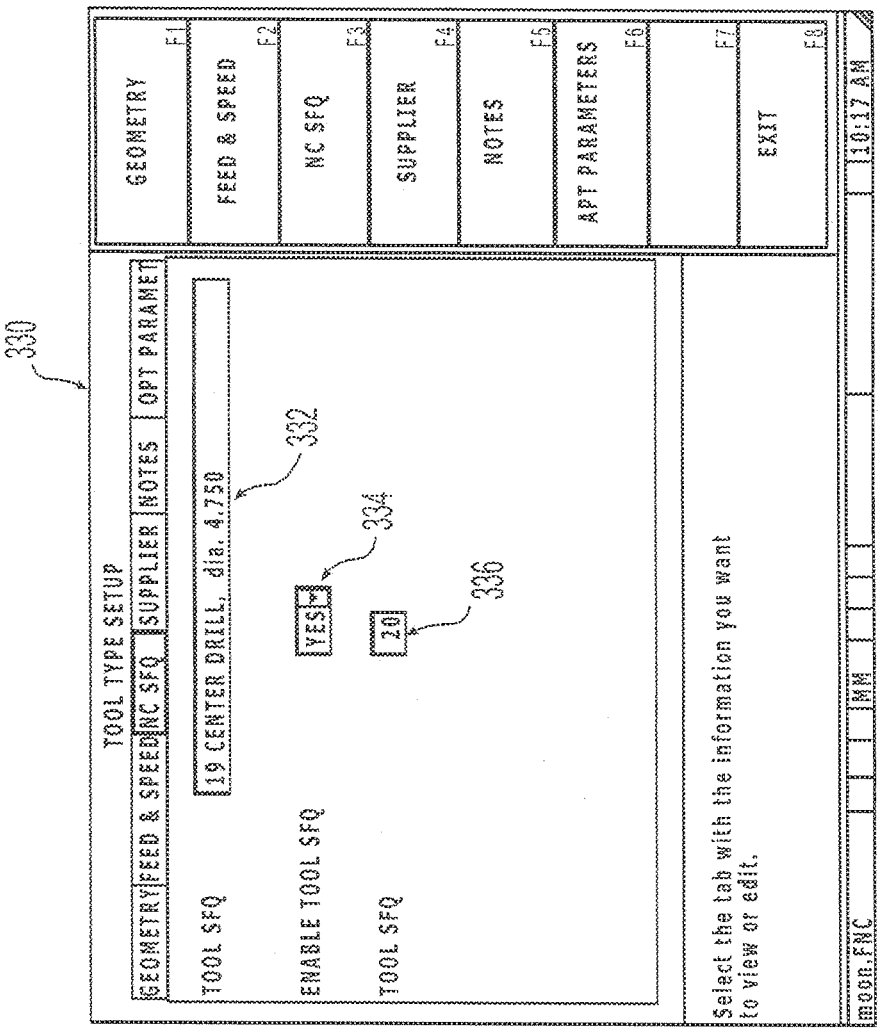

330
TOOL TYPE SETUP
GEOMETRY
FEED & SPEED
NC SFQ
SUPPLIER
NOTES
OPT PARAMET
TOOL SFQ
19 CENTER DRILL, dia. 4.750
332
ENABLE TOOL SFQ
YES
334
TOOL SFQ
20
336
Select the tab with the information you want to view or edit.
GEOMETRY F1
FEED & SPEED F2
NC SFQ F3
SUPPLIER F4
NOTES F5
APT PARAMETERS F6
F7
EXIT F8
moon.FNC
MM
10:17 AM

Fig. 9

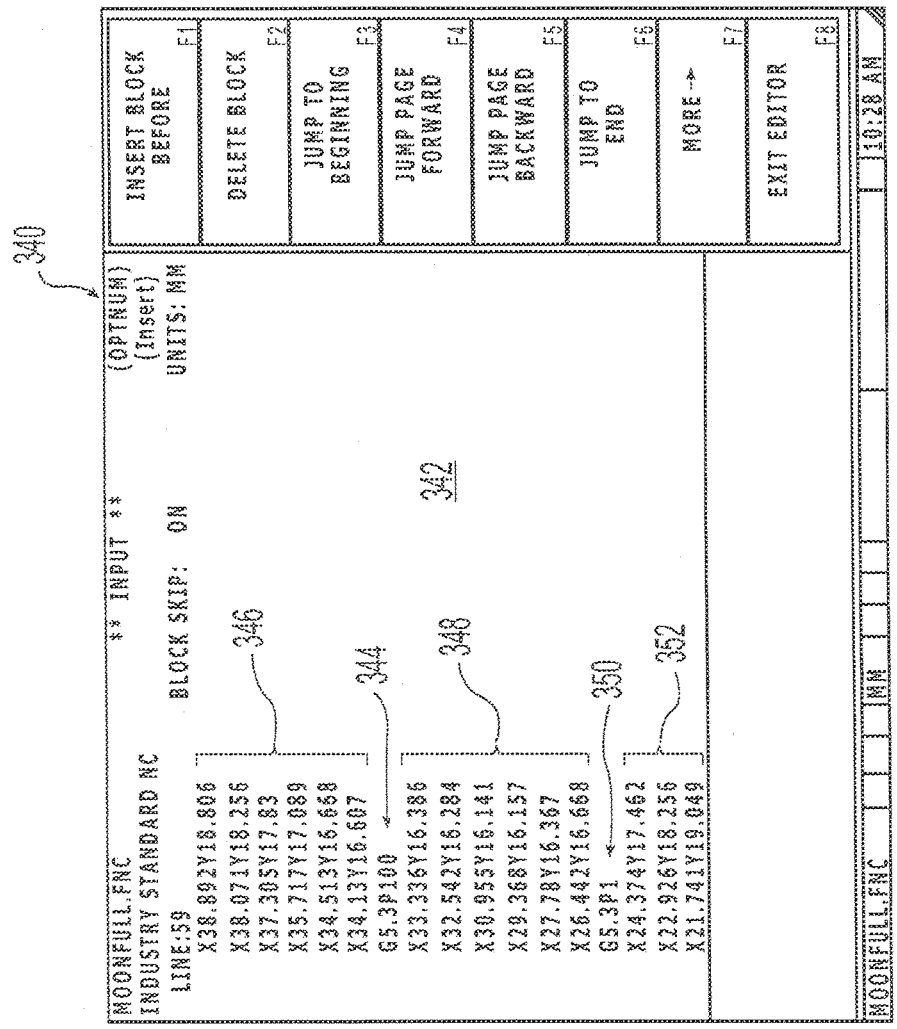

340
MOONFULL.FNC
INDUSTRY STANDARD NC
LINE:59
** INPUT **
BLOCK SKIP: ON
(OPTNUM)
(Insert)
UNITS: MM
X38.892Y18.806
X38.071Y18.256
X37.305Y17.83
X35.717Y17.089
X34.513Y16.668
X34.13Y16.607
G5.3P100
X33.336Y16.386
X32.542Y16.284
X30.955Y16.141
X29.368Y16.157
X27.78Y16.367
X26.442Y16.668
G5.3P1
X24.374Y17.462
X22.926Y18.256
X21.741Y19.049
346
344
342
348
350
352
INSERT BLOCK BEFORE F1
DELETE BLOCK F2
JUMP TO BEGINNING F3
JUMP PAGE FORWARD F4
JUMP PAGE BACKWARD F5
JUMP TO END F6
MORE→ F7
EXIT EDITOR F8
10:28 AM
MOONFULL.FNC
MM

Fig. 10

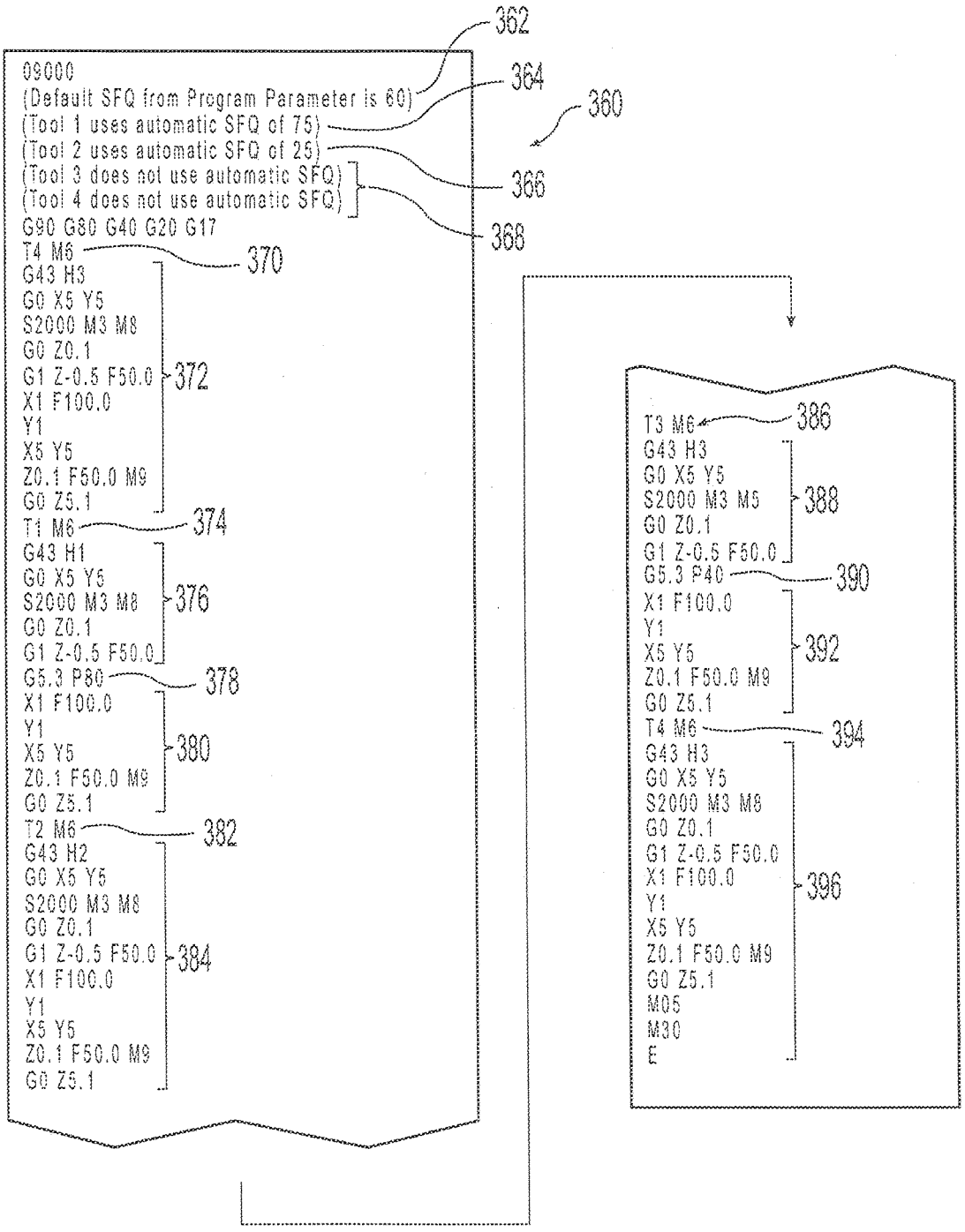

362
364
360
366
368
370
372
374
376
378
380
382
384
386
388
390
392
394
396
09000
(Default SFQ from Program Parameter is 60)
(Tool 1 uses automatic SFQ of 75)
(Tool 2 uses automatic SFQ of 25)
(Tool 3 does not use automatic SFQ)
(Tool 4 does not use automatic SFQ)
G90 G80 G40 G20 G17
T4 M6
G43 H3
G0 X5 Y5
S2000 M3 M8
G0 Z0.1
G1 Z-0.5 F50.0
X1 F100.0
Y1
X5 Y5
Z0.1 F50.0 M9
G0 Z5.1
T1 M6
G43 H1
G0 X5 Y5
S2000 M3 M8
G0 Z0.1
G1 Z-0.5 F50.0
G5.3 P80
X1 F100.0
Y1
X5 Y5
Z0.1 F50.0 M9
G0 Z5.1
T2 M6
G43 H2
G0 X5 Y5
S2000 M3 M8
G0 Z0.1
G1 Z-0.5 F50.0
X1 F100.0
Y1
X5 Y5
Z0.1 F50.0 M9
G0 Z5.1
T3 M6
G43 H3
G0 X5 Y5
S2000 M3 M8
G0 Z0.1
G1 Z-0.5 F50.0
G5.3 P40
X1 F100.0
Y1
X5 Y5
Z0.1 F50.0 M9
G0 Z5.1
T4 M6
G43 H3
G0 X5 Y5
S2000 M3 M8
G0 Z0.1
G1 Z-0.5 F50.0
X1 F100.0
Y1
X5 Y5
Z0.1 F50.0 M9
G0 Z5.1
M05
M30
E

Fig. 11

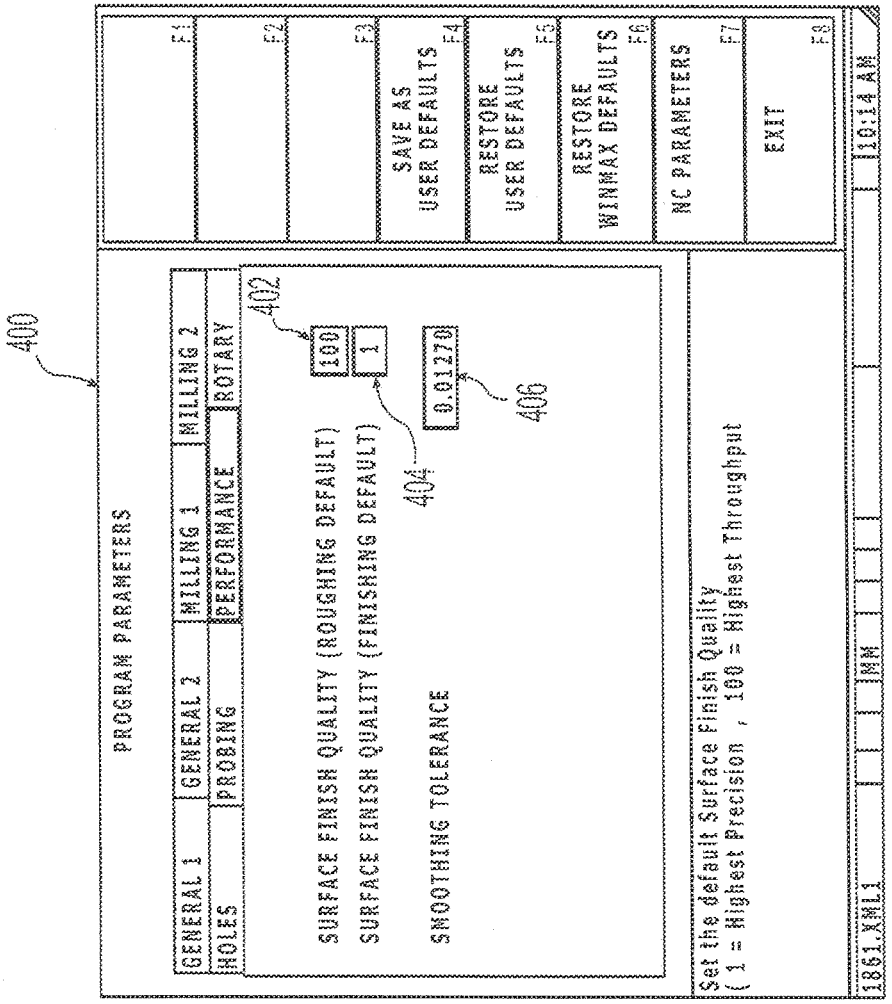

400
PROGRAM PARAMETERS
GENERAL 1
GENERAL 2
MILLING 1
MILLING 2
HOLES
PROBING
PERFORMANCE
ROTARY
402
SURFACE FINISH QUALITY (ROUGHING DEFAULT)
100
SURFACE FINISH QUALITY (FINISHING DEFAULT)
1
404
SMOOTHING TOLERANCE
0.01270
406
F1
F2
F3
SAVE AS USER DEFAULTS F4
RESTORE USER DEFAULTS F5
RESTORE WINMAX DEFAULTS F6
NC PARAMETERS F7
EXIT F8
Set the default Surface Finish Quality
(1 = Highest Precision , 100 = Highest Throughput
1861.XML1
MM
10:14 AM

Fig. 12

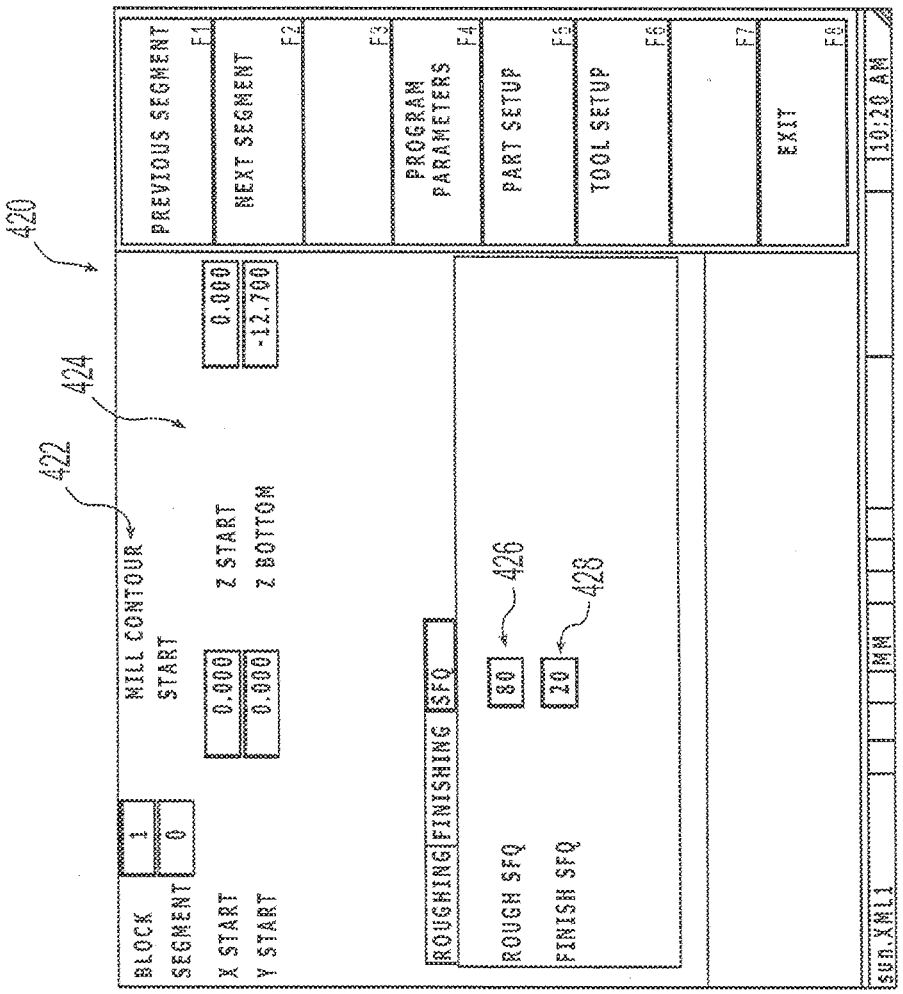

420
424
422
426
428
PREVIOUS SEGMENT
F1
NEXT SEGMENT
F2
F3
PROGRAM PARAMETERS
F4
PART SETUP
F5
TOOL SETUP
F6
F7
EXIT
F8
MILL CONTOUR
START
BLOCK
1
SEGMENT
0
X START
0.000
Y START
0.000
Z START
0.000
Z BOTTOM
-12.700
ROUGHING
FINISHING
SFQ
ROUGH SFQ
80
FINISH SFQ
20
MM
SUB.XML1
10:20 AM

Fig. 13

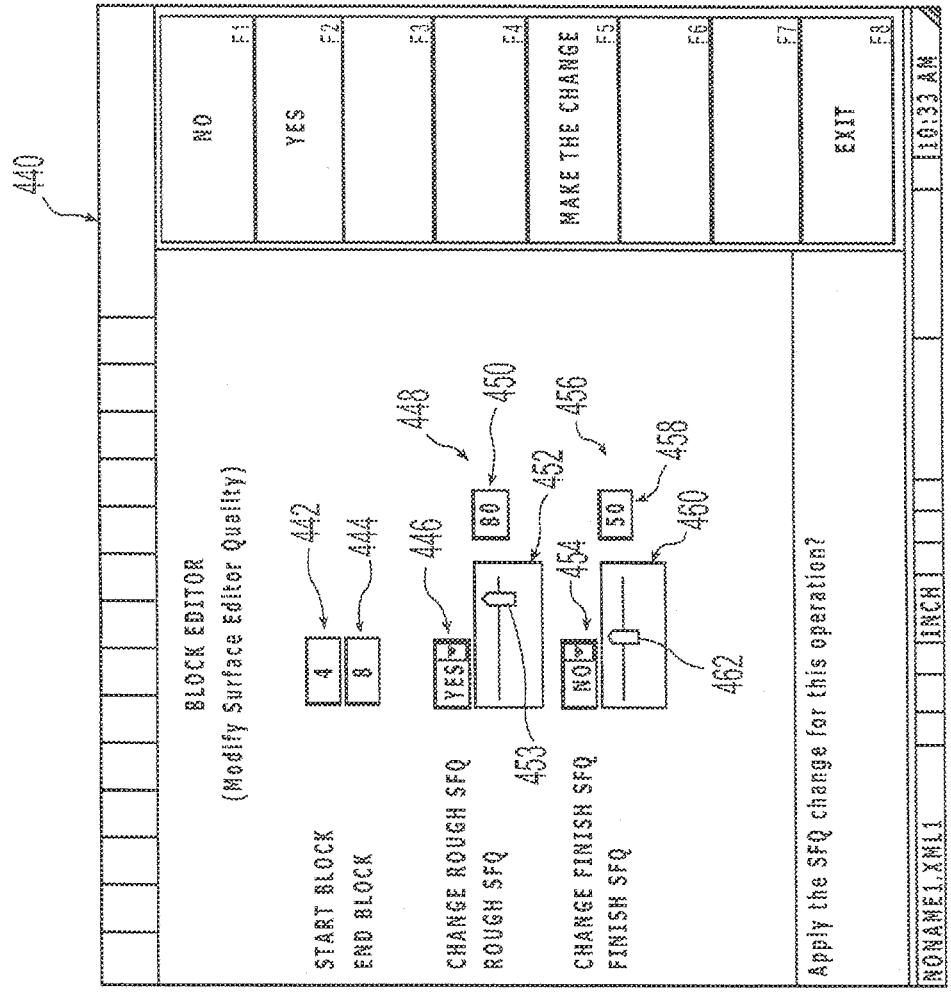
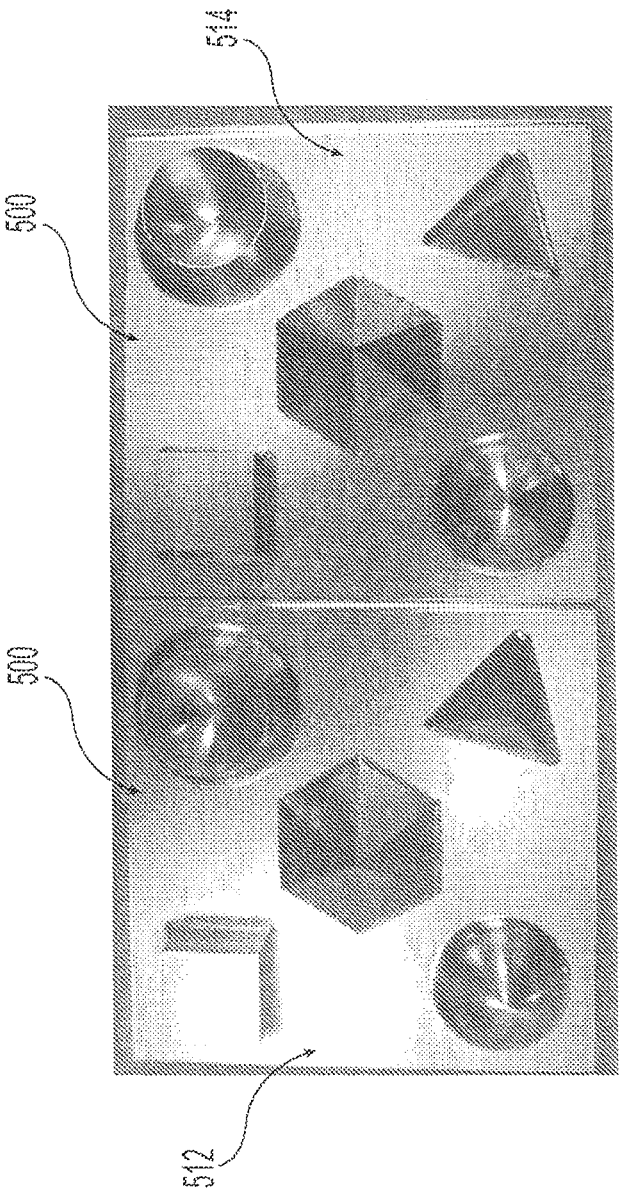

440
NO F1
YES F2
F3
F4
MAKE THE CHANGE F5
F6
F7
EXIT F8
10:33 AM
BLOCK EDITOR
(Modify Surface Editor Quality)
START BLOCK
END BLOCK
CHANGE ROUGH SFQ
ROUGH SFQ
CHANGE FINISH SFQ
FINISH SFQ
4
8
YES
80
NO
50
Apply the SFQ change for this operation?
NONAME1.XML1
INCH
442
444
446
448
450
452
453
454
456
458
460
462

Fig. 14



SFQ 100 (roughing) 50 (finishing)
Run Time 2:49:13

Fig. 15A

SFQ 50 (roughing) 50 (finishing)
Run Time 3:41:13

Fig. 15B

Same Surface Finish Quality and Saved near One Hour Using High SFQ Value in Roughing