US 20020009017A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2002/0009017 A1

Kolar et al. (43) Pub. Date: Jan. 24, 2002

(54) BLENDER HAVING USER OPERATED DRINK PROGRAM MODIFYING AND COPYING PROCESSOR

(76) Inventors: **David J. Kolar**, Streetsboro, OH (US); **Hassan Varghai**, Solon, OH (US)

Correspondence Address:
Renner, Kenner, Greive, Bobak, Taylor & Weber
First National Tower, Fourth Floor
Akron, OH 44308-1456 (US)

(21) Appl. No.: **09/883,882**

(22) Filed: **Jun. 18, 2001**

Related U.S. Application Data

(63) Continuation-in-part of application No. 09/311,104, filed on May 12, 1999.

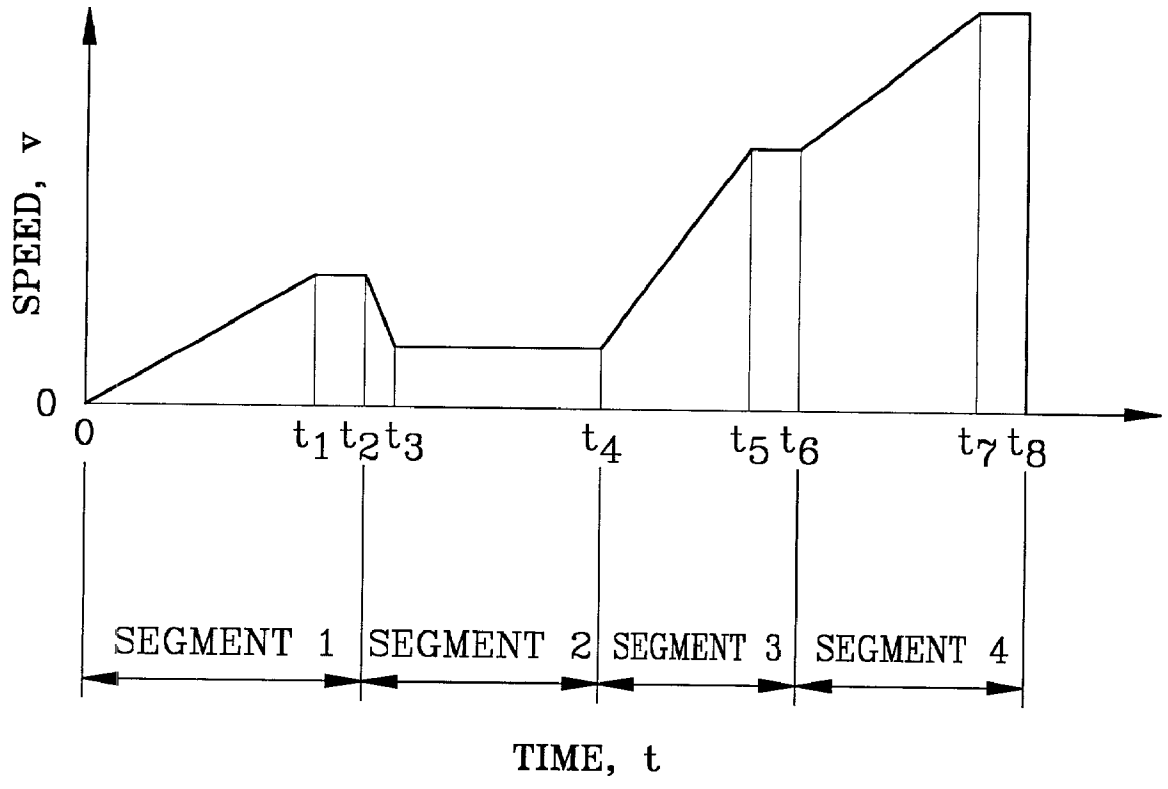
Publication Classification

(51) **Int. Cl.**[7] **B01F 7/02**

(52) **U.S. Cl.** **366/206**

(57) **ABSTRACT**

A programmable drink blender (**20**) includes a blender motor (**25**), a user interface and display (**24**) having a plurality of buttons (**30**) for entry of various user selections, a base memory (**70**) storing a blend program, a key card (**50**) having a memory storing a blend program, a socket (**68**) receiving the key card (**50**), and a processor (**62**) for controlling blender motor (**25**) in accordance with the blend program. The blend program has a plurality of operating segments with variable blend program operating characteristics. The user presses selected buttons (**30**) to cause processor (**62**) to modify and save any desired characteristic of the blend program. The user also presses selected buttons (**30**) to cause processor (**62**) to copy the blend program from memory in key card (**50**) to base memory (**70**), and vice versa.



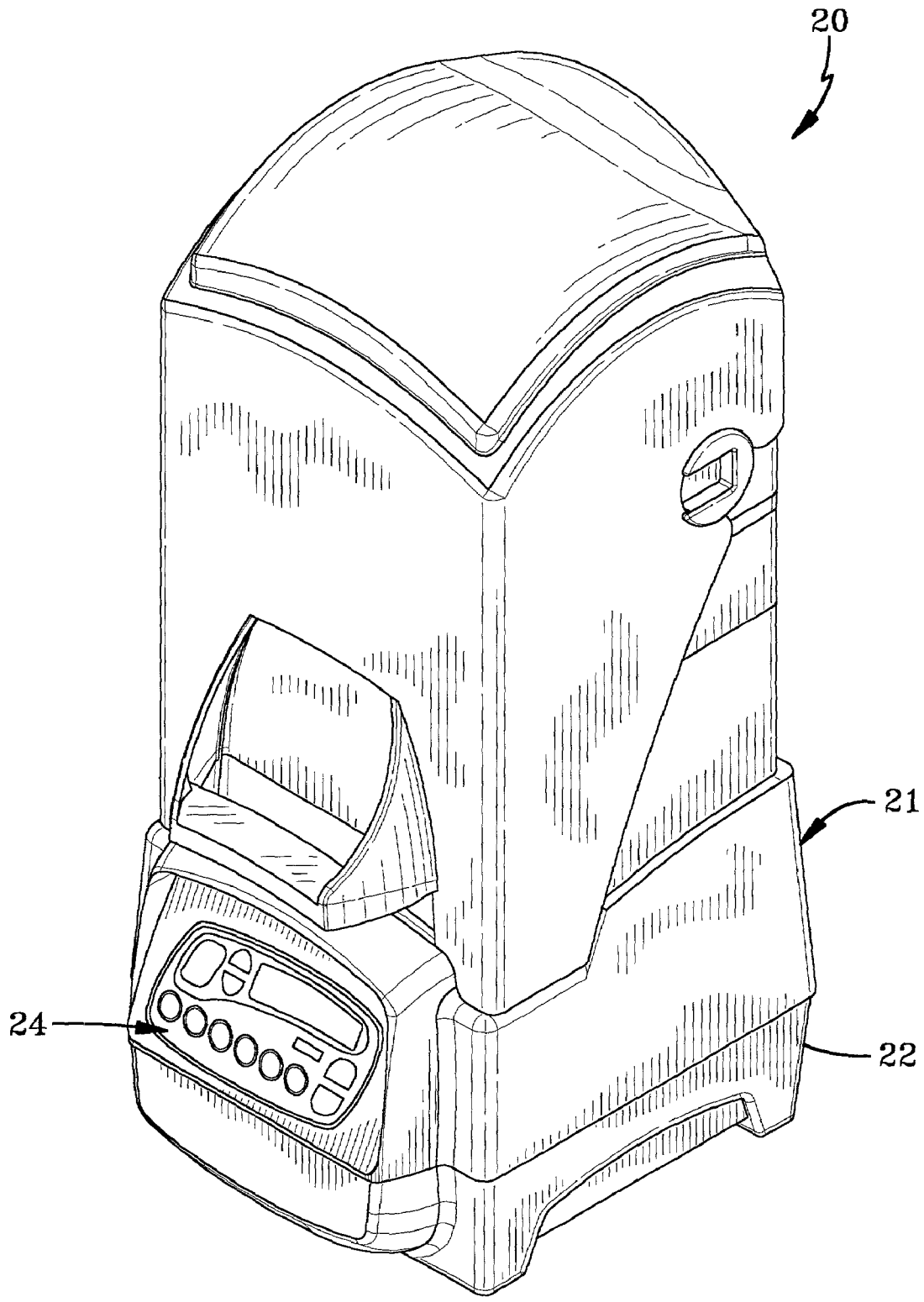


FIG-1

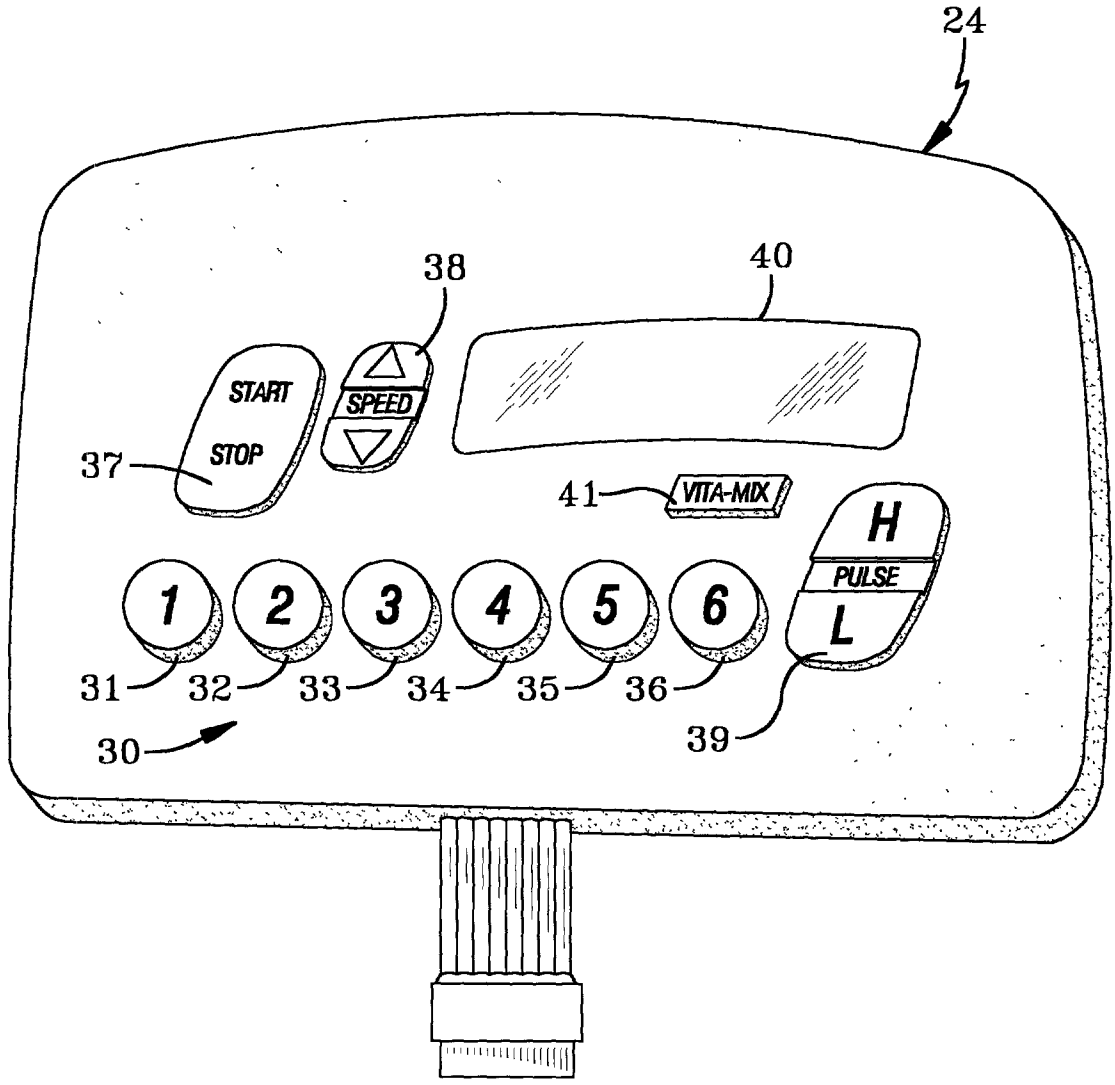

24
38
40
START
STOP
SPEED
37
41
VITA-MIX
H
PULSE
L
1
2
3
4
5
6
31
32
33
34
35
36
30
39

FIG-2

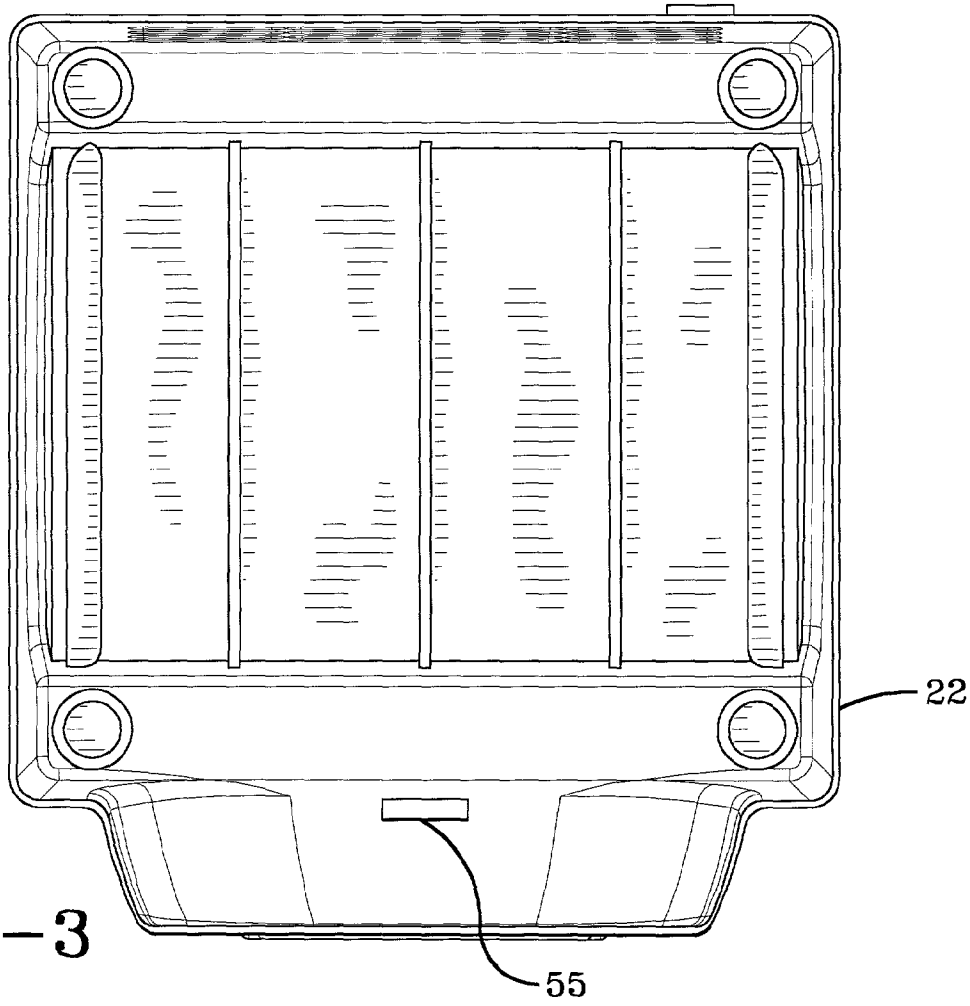


FIG-3

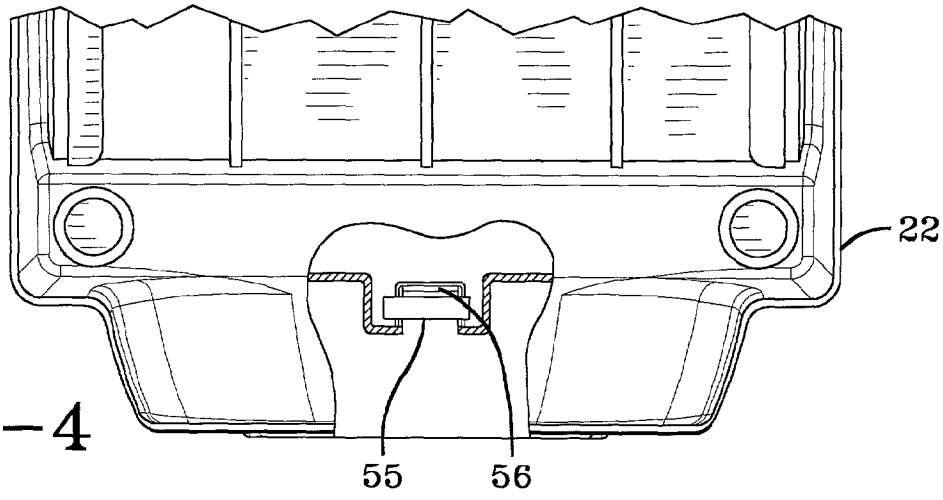


FIG-4

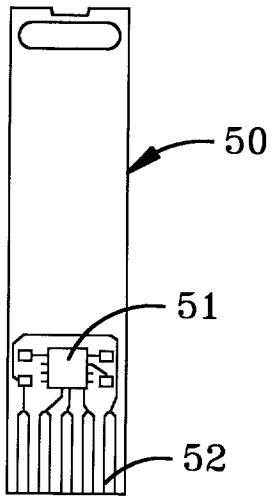

50
51
52

FIG-5

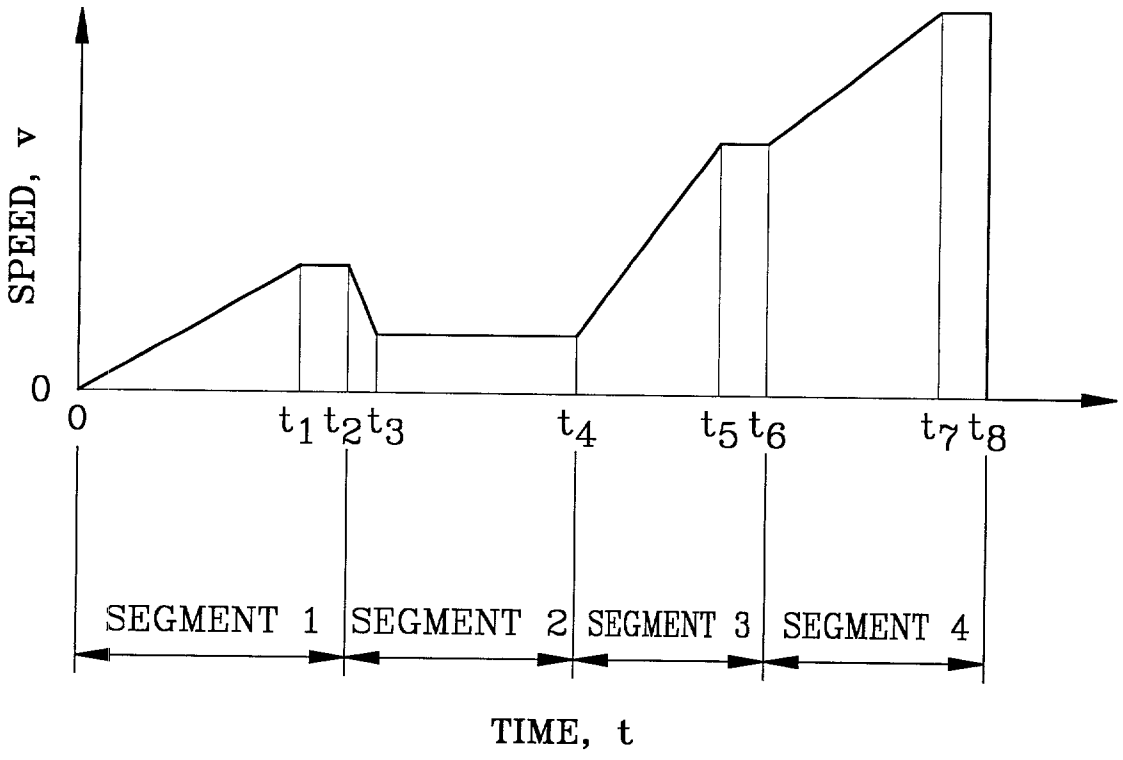

SPEED, v
0
0
t1 t2 t3
t4
t5 t6
t7 t8
SEGMENT 1
SEGMENT 2
SEGMENT 3
SEGMENT 4
TIME, t

FIG-6

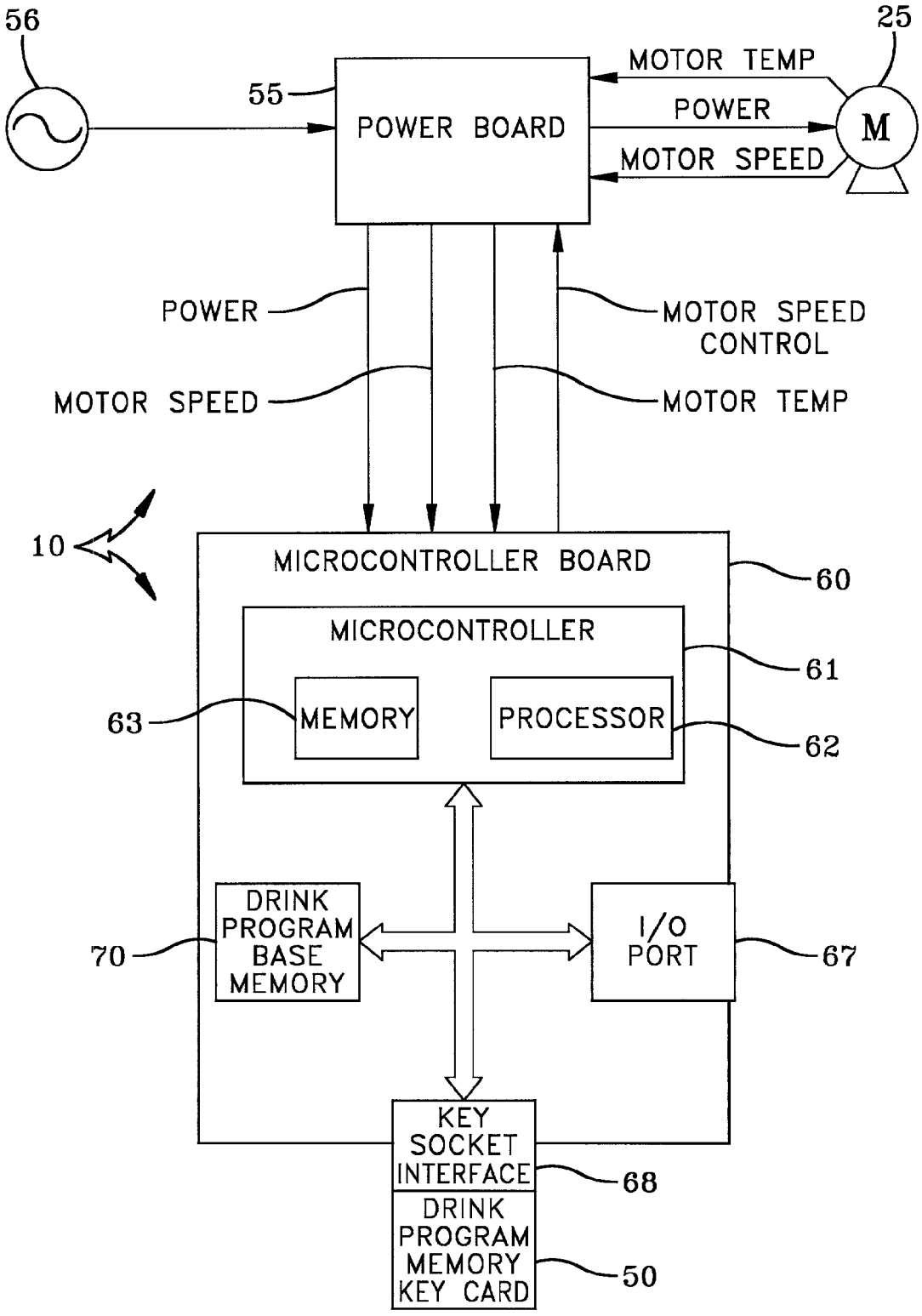

56
25
55
POWER BOARD
MOTOR TEMP
POWER
MOTOR SPEED
M
POWER
MOTOR SPEED
MOTOR SPEED CONTROL
MOTOR TEMP
10
MICROCONTROLLER BOARD
60
MICROCONTROLLER
61
63
MEMORY
PROCESSOR
62
DRINK PROGRAM BASE MEMORY
70
I/O PORT
67
KEY SOCKET INTERFACE
68
DRINK PROGRAM MEMORY KEY CARD
50

FIG-7

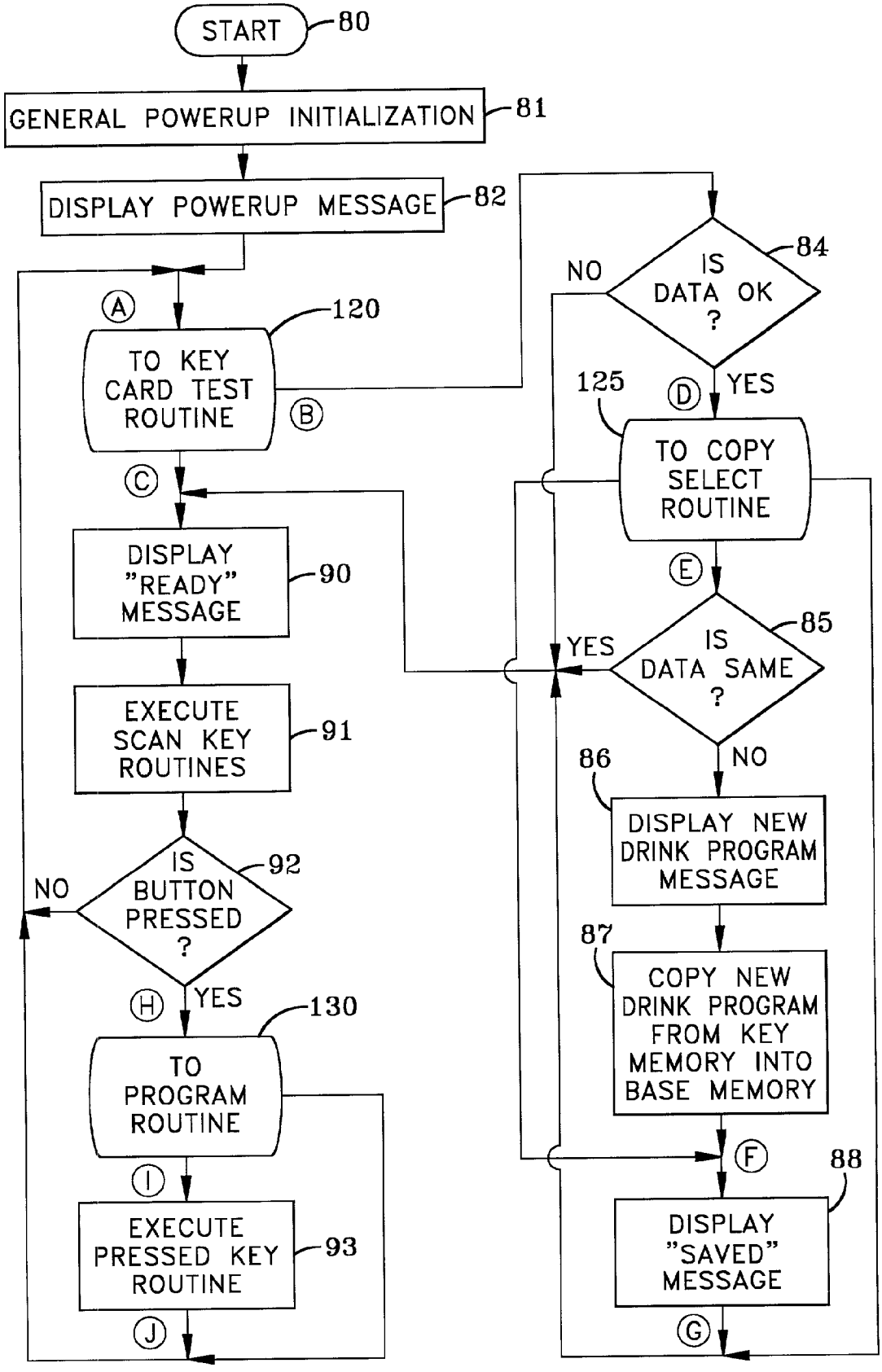

START
80
GENERAL POWERUP INITIALIZATION
81
DISPLAY POWERUP MESSAGE
82
A
120
TO KEY CARD TEST ROUTINE
B
C
DISPLAY "READY" MESSAGE
90
EXECUTE SCAN KEY ROUTINES
91
IS BUTTON PRESSED ?
92
NO
H
YES
130
TO PROGRAM ROUTINE
I
EXECUTE PRESSED KEY ROUTINE
93
J
IS DATA OK ?
84
NO
D
YES
125
TO COPY SELECT ROUTINE
E
IS DATA SAME ?
85
YES
NO
86
DISPLAY NEW DRINK PROGRAM MESSAGE
87
COPY NEW DRINK PROGRAM FROM KEY MEMORY INTO BASE MEMORY
F
88
DISPLAY "SAVED" MESSAGE
G

FIG-8

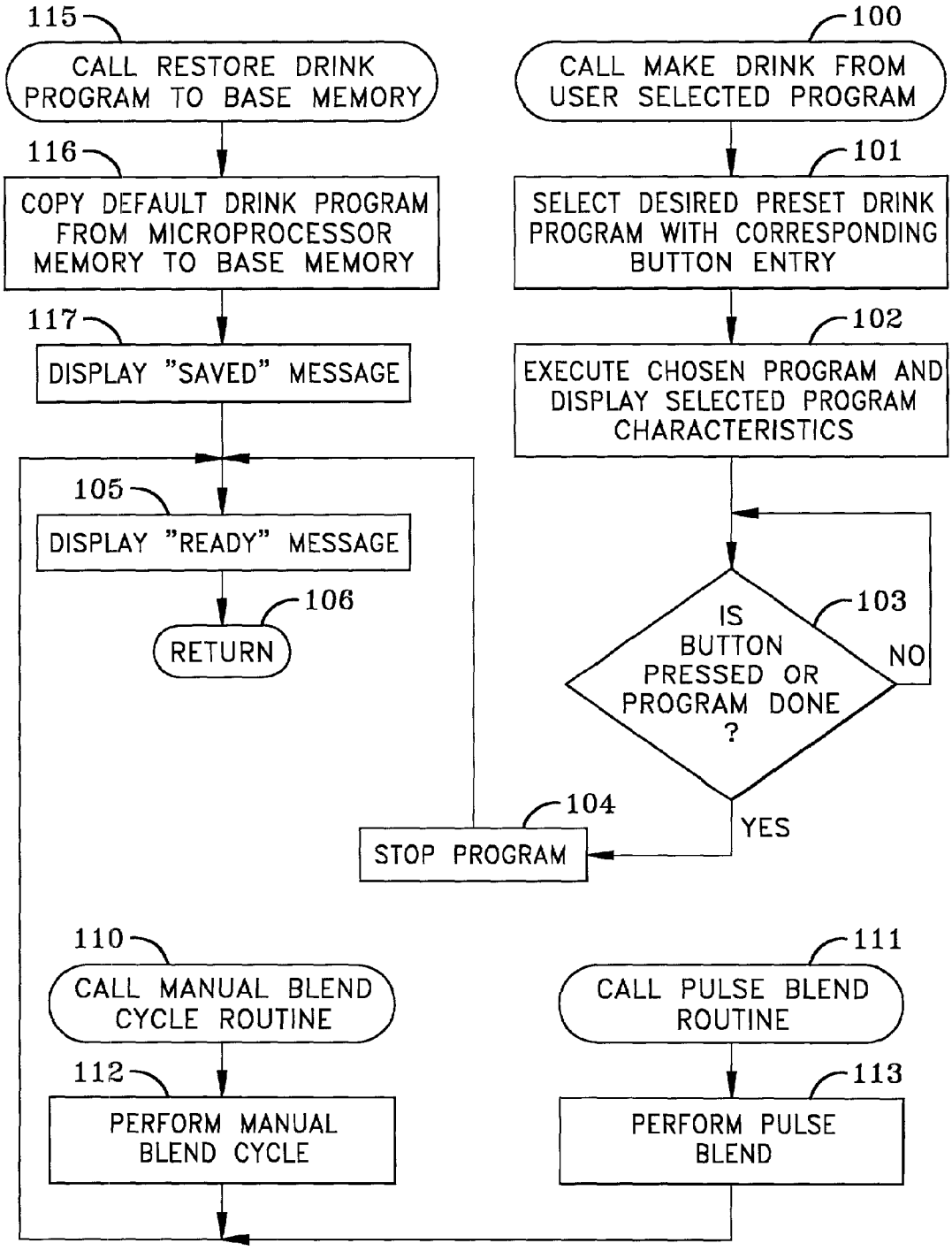

115
CALL RESTORE DRINK PROGRAM TO BASE MEMORY
116
COPY DEFAULT DRINK PROGRAM FROM MICROPROCESSOR MEMORY TO BASE MEMORY
117
DISPLAY "SAVED" MESSAGE
105
DISPLAY "READY" MESSAGE
106
RETURN
100
CALL MAKE DRINK FROM USER SELECTED PROGRAM
101
SELECT DESIRED PRESET DRINK PROGRAM WITH CORRESPONDING BUTTON ENTRY
102
EXECUTE CHOSEN PROGRAM AND DISPLAY SELECTED PROGRAM CHARACTERISTICS
103
IS BUTTON PRESSED OR PROGRAM DONE ?
NO
YES
104
STOP PROGRAM
110
CALL MANUAL BLEND CYCLE ROUTINE
112
PERFORM MANUAL BLEND CYCLE
111
CALL PULSE BLEND ROUTINE
113
PERFORM PULSE BLEND

FIG-9

FIG-10

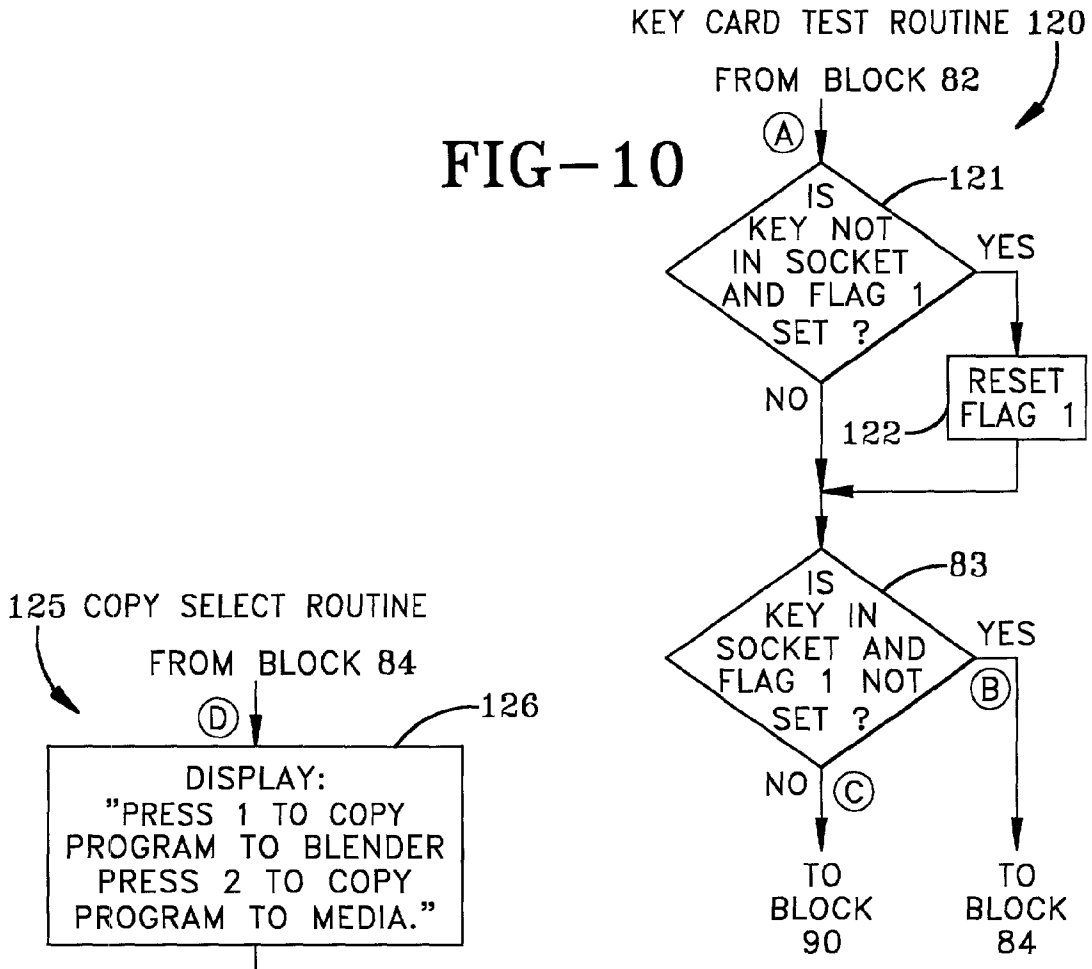

KEY CARD TEST ROUTINE 120
FROM BLOCK 82
A
121
IS KEY NOT IN SOCKET AND FLAG 1 SET ?
YES
NO
RESET FLAG 1
122
83
IS KEY IN SOCKET AND FLAG 1 NOT SET ?
YES
B
NO
C
TO BLOCK 90
TO BLOCK 84
125 COPY SELECT ROUTINE
FROM BLOCK 84
D
126
DISPLAY: "PRESS 1 TO COPY PROGRAM TO BLENDER PRESS 2 TO COPY PROGRAM TO MEDIA."
127
IS BUTTON 1 PRESSED ?
NO
YES
129
DISPLAY: "COPY DRINK PROGRAM FROM BASE MEMORY TO MEMORY IN KEY CARD AND SET FLAG 1"
128
IS BUTTON 2 PRESSED ?
NO
YES
F
G
E
TO BLOCK 88
TO BLOCK 90
TO BLOCK 85

FIG-11

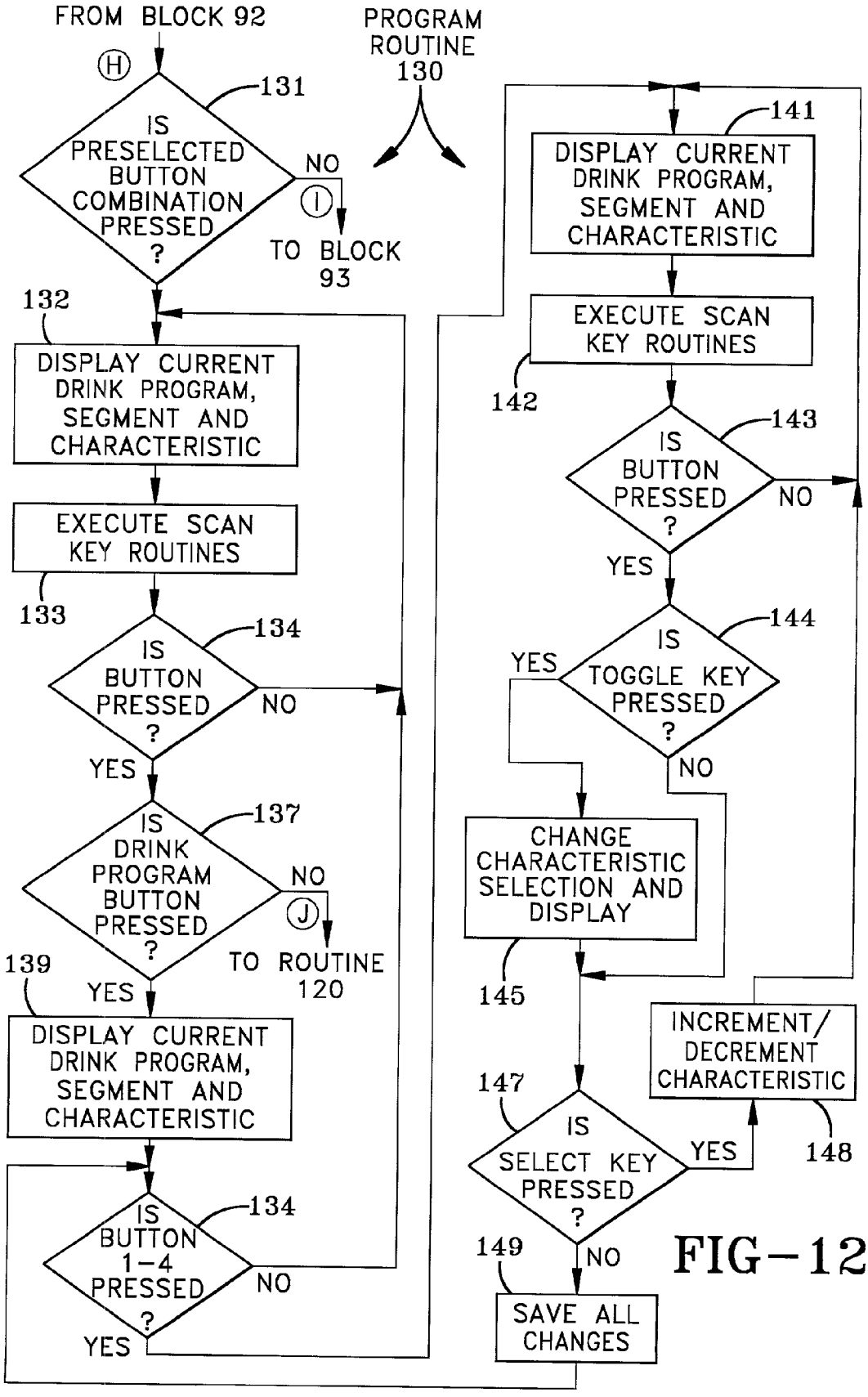

FROM BLOCK 92
PROGRAM ROUTINE 130
H
131
IS PRESELECTED BUTTON COMBINATION PRESSED ?
NO
I
TO BLOCK 93
132
DISPLAY CURRENT DRINK PROGRAM, SEGMENT AND CHARACTERISTIC
EXECUTE SCAN KEY ROUTINES
133
134
IS BUTTON PRESSED ?
NO
YES
137
IS DRINK PROGRAM BUTTON PRESSED ?
NO
J
TO ROUTINE 120
139
YES
DISPLAY CURRENT DRINK PROGRAM, SEGMENT AND CHARACTERISTIC
134
IS BUTTON 1-4 PRESSED ?
NO
YES
141
DISPLAY CURRENT DRINK PROGRAM, SEGMENT AND CHARACTERISTIC
EXECUTE SCAN KEY ROUTINES
142
143
IS BUTTON PRESSED ?
NO
YES
144
IS TOGGLE KEY PRESSED ?
YES
NO
CHANGE CHARACTERISTIC SELECTION AND DISPLAY
145
INCREMENT/ DECREMENT CHARACTERISTIC
148
147
IS SELECT KEY PRESSED ?
YES
149
NO
SAVE ALL CHANGES

FIG-12

BLENDER HAVING USER OPERATED DRINK PROGRAM MODIFYING AND COPYING PROCESSOR

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 09/311,104 filed May 12, 1999.

TECHNICAL FIELD

[0002] The present invention relates in general to appliances used to process food and drinks. More particularly, the present invention pertains to food and drink blenders having a plurality of programmable blend operations selectively actuated by the user. More specifically, the present invention relates to such blenders where the programmable blend operations may be loaded, changed and copied by the user without the use of an external device such as a computer.

BACKGROUND ART

[0003] Appliances to facilitate the processing of food and drink ingredients have become ubiquitous in both commercial and residential settings. Such appliances are particularly useful where there are a variety of operations to be performed repeatedly with accuracy and precision, such as with the blending of drinks in commercial establishments like bars and restaurants.

[0004] Originally drink blenders required the user to manually start and stop the blender motor, leaving the quality of the blend and resulting drink, and the consistency of the mixture, to the skill of the user and chance. Moreover, the motor included within these blenders had a single operating speed that was too fast for some blends and too slow for others, making quality blends and consistent mixtures even more difficult for the user to manually achieve.

[0005] User selectable motor speed controls and timers were incorporated into blenders to facilitate greater consistency from drink to drink, but the user had to reset the controls each time a different kind of drink was to be made, and most times a different ingredient was added.

[0006] More recently, digital electronics has made it feasible for blenders to include memory in which is stored the different motor speeds and operating intervals required for making a plurality of kinds of drinks. These digitally controlled blenders kept user control activity to a minimum by furnishing a separate button for each kind of drink whose program (called a "drink program" or "blend program") was stored in memory. A user simply pressed the button corresponding to the desired kind of drink, and pushed a start button to commence blending of a drink. The resulting drinks were the same no matter who made it, or when or where it was made. The fast, consistent, reliable and complete mixing performed by these blending units were welcomed by both commercial and residential users.

[0007] From time to time changes in user taste or preference, or changes in location of a blender used in commercial food service, has given rise to a desire or need to change a drink program or substitute programming for different kinds of drinks. A like need also might arise from corruption or loss of preprogrammed drink operation stored in memory such as from electrical failure. In the past, modification or replacement of drink programming required that the unit be returned to the manufacturer because disassembly was needed, precluding reprogramming outside the manufacturer's facility (i.e., in the field). A user could not modify or replace one or more drink programs at the user's site.

[0008] More recently, however, machines that may allow for a limited extent of program entry by the user may have become commercially available. The models "Copacabana" and "ipanema" from Gaggia Espanola, S.A. of Barcelona Spain are machines for the making of espresso and cappuccino drinks. These machines appear to read information encoded by an external programming device onto a magnetic strip adhered to a plastic card, much the same as an Automated Teller Machine reads information off a credit card. The model "ABC Blender" from the Blendtec division of K-TEC of Orem Utah connects via a serial programming port to an external computer from which drink programs may be entered.

[0009] Both the Gaggia Esponola drink machine and the ABC Blender require an external device such as a computer to enter, modify or duplicate the drink programs. Generally, such additional, sometimes specialized equipment is not available to or convenient for the user. As a result, this makes uneconomical and often precludes user modification of existing drink programs and the creation of new drink programs, and prevents distribution of such programs to other blenders at the same or related sites.

SUMMARY OF THE INVENTION

[0010] It is, therefore, an object of the present invention to provide an appliance for processing of food and drink ingredients having a plurality of preprogrammable blend programs, in which the blend programs allow programming for multiple ingredient blends requiring a plurality of intervals of motor operation at different velocities and accelerations.

[0011] It is another object of the present invention to provide an appliance, as set forth above, in which the blend programs may be changed by the user, and the modified blend programs saved to nonvolatile memory, using only the appliance itself.

[0012] It is still another object of the present invention to provide an appliance, as set forth above, in which user changes to blend programs may include modification of any drink mix characteristic or the ice content of any drink including ice, using only the appliance itself.

[0013] It is yet another object of the present invention to provide an appliance, as set forth above, in which entirely new blend programs may be created by the user, and the new blend programs saved to nonvolatile memory, using only the appliance itself.

[0014] It is a further object of the present invention to provide an appliance, as set forth above, in which the user may duplicate the blend programs for use in other blenders or as backup, using only the appliance itself.

[0015] It is still a further object of the present invention to provide an appliance, as set forth above, in which the user may copy selected blend programs to a transfer mechanism such as physical media, using only the appliance itself.

[0016] These and other objects and advantages of the present invention over existing prior art forms will become more apparent and fully understood from the following description in conjunction with the accompanying drawings.

[0017] In general, a programmable blender for executing a blend program includes a blending assembly for blending ingredients, memory including a first blend program having a plurality of operating segments with variable blend program operating characteristics, input means for user selection of a first operating characteristic to be modified and the modification magnitude, and a processor. The processor receives the blend program from the memory and the user selection from the input means, modifies the first operating characteristic in accordance with the user selection, and controls operation of the blending assembly in accordance with the modified blend program.

[0018] A blender for executing a blend program includes a blending assembly for blending ingredients, a first memory resident in the blender for storing a blend program, a second memory in operative association with the blender for storing the blend program, and a processor resident in the blender receiving the blend program and selectively copying the blend program from the first memory to the second memory and from the second memory to the first memory.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] **FIG. 1** is a perspective view of an exemplary blender in accordance with the present invention.

[0020] **FIG. 2** is a front view of the exemplary user interface and display of the blender shown in **FIG. 1**, depicting six numbered buttons for the selection of drink programs stored in blender memory.

[0021] **FIG. 3** is a bottom view of the blender lower housing, depicting a slot for the insertion of a drink program memory key card.

[0022] **FIG. 4** is a partial bottom view of the blender lower housing illustrated in **FIG. 3**, depicting in break-away an interior section of the slot for insertion of a drink program memory key card.

[0023] **FIG. 5** is a top view of an exemplary drink program memory key card in accordance with the present invention.

[0024] **FIG. 6** is a graph of blender motor speed verses time for an exemplary drink program having four operating segments each with different motor speeds, ramp rates and durations.

[0025] **FIG. 7** is a block diagram of an exemplary blender control in accordance with the present invention, and includes a diagrammatic presentation of an exemplary blender motor.

[0026] **FIG. 8** is a top-level flow chart of an exemplary blender control program in accordance with the present invention.

[0027] **FIG. 9** is a top-level flow chart of four exemplary operating routines included within the exemplary blender control shown in **FIG. 8**.

[0028] **FIG. 10** is a top-level flow chart of an exemplary key card test routine included within the exemplary blender control program shown in **FIG. 8**.

[0029] **FIG. 11** is a top-level flow chart of an exemplary blend program copy select routine included within the exemplary blender control program shown in **FIG. 8**.

[0030] **FIG. 12** is a top-level flow chart of an exemplary routine for modifying or selecting new blend program characteristics in blend programs. This routine is included within the exemplary blender control program shown in **FIG. 8**.

PREFERRED EMBODIMENT FOR CARRYING OUT THE INVENTION

[0031] An exemplary blender control in accordance with the present invention is indicated generally by the numeral **10** in **FIG. 7**, and may work with a variety of food and drink blenders. One such blender is shown in perspective in **FIG. 1**, and is indicated generally by the numeral **20**. Blender **20** includes a housing **21** having a lower housing member **22**, a user interface and display **24**, and a blending assembly including a motor **25** (seen in **FIG. 7**).

[0032] User interface and display **24**, best shown in **FIG. 2**, includes a plurality of user input pushbuttons (hereinafter referred to as "buttons") for the selection, modification and creation of drink programs stored in blender memory. These include a plurality of numbered momentary buttons **30** (individually referred to as buttons **31-36**). User interface and display **24** further includes a start/stop button **37**, a speed change button **38**, a blender motor pulse button **39**, a display **40** and a mode select button **41**. Start/stop button **37**, speed change button **38** and pulse button **39**, allow manual control of blender motor **25** by the user, including starting, stopping, incremental speed increases and decreases, and high and low speed pulsing, all as is well known in the art. Display **40** may be any display capability of presentation of the desired messages, such as a two line, sixteen character vacuum fluorescent display. Mode select button **41** may be used to initiate a program routine for user entry of drink program characteristic modifications or creation of new drink programs, as further discussed hereinafter.

[0033] **FIG. 5** presents a top view of exemplary memory media such as drink program memory key card in accordance with the present invention, indicated generally by the numeral **50**, and in operative association with blender **20**. The exemplary key card **50** shown in **FIG. 5** is a rectangular shaped printed circuit board large enough to carry a drink program key memory integrated circuit **51** (hereinafter referred to as "IC"**51**, discussed further hereinafter) and be conveniently handled by a user, say about ⅝ inch (1.59 cm) by 2.5 inches (6.35 cm). Key card **50** includes on one narrow end a conventional edge connector **52** for engagement with, and electrically connecting the circuit on key card **50** to, a mating key socket interface discussed further hereinafter.

[0034] As best seen in **FIGS. 3 and 4**, blender **20** includes integrally formed in its lower housing member **22** a slot **55** into which the user inserts key card **50** until its edge connector **52** engages and seats in the mating socket to be described further hereinafter. Slot **55** may include a ramp **56** or other mechanical feature as might occur to one of ordinary skill in the arts, that would facilitate the correct orientation and seating of edge connector **52** to its mating socket.

[0035] The present invention allows for storage and reprogramming of drink programs having a plurality of operating

segments. **FIG. 6** presents a graph of blender motor speed verses time for an exemplary drink program having four operating segments each with different, variable operating characteristics. The speed of blender motor **25** is increased from zero at time zero to some preselected first velocity at time t_1. Blender motor **25** operates at the first velocity until time t_2. The time interval from time zero to t_2 may be referred to as segment **1**, and the rate at which the speed of blender motor **25** increases from time zero to time t_1 may be referred to as the segment **1** ramp rate. Ramp rates, target velocities, and operating durations are selected in a similar manner and shown for the remaining segments **2**, **3** and **4** with time intervals t_3, t_4, t_5, t_6, t_7, and t_8.

[**0036**] Referring now to **FIG. 7**, exemplary blender control **10** can be seen to broadly include a power board **55** receiving power from a conventional power source **56** such as 60 Hz, 120 V, a microcontroller board **60** and the drink program memory key card **50** noted hereinbefore. Microcontroller board **60** includes a microcontroller **61** having a processor **62** and nonvolatile microcontroller memory **63**, and communicates data and control information via bus **66** with an input/output (hereinafter referred to as "I/O") port **67**, an edge connector key socket **68** for receiving and mating with drink program memory key card **50**, and drink program base memory **70**.

[**0037**] Power board **55** furnishes all required power to blender control **10** and blender motor **25**. Power board **55** also receives signals a characteristic of which provides periodic information about the temperature and speed of blender motor **25** from a thermocouple or other thermal sensor, and a tachometer or other rotational velocity sensor in operative association with blender motor **25**, and furnishes those signals to microcontroller board **60** and processor **62**.

[**0038**] Microcontroller **61** may be any microcontroller whose processor **62** and memory **63** are suitable for blender control in accordance with the present invention. Memory **63** stores the blender control program described herein, and may also store a backup copy of an original or start drink program. I/O port **67** may be any conventional communication port to permit manufacturer communication with microcontroller **61** and the loading of the desired original or start drink program into microcontroller memory **63**. Drink program base memory **70**, resident in blender **20**, may be any conventional, nonvolatile memory with sufficient capacity to store the desired drink program data. Key socket **68** may include a conventional current sensor whereby as soon it receives and mates with drink program memory key card **50**, processor **62** is automatically alerted via interrupt or other means known to the skilled artisan.

[**0039**] **FIGS. 8 and 9** present top-level flow charts for an exemplary algorithm executed by blender control **10** in accordance with the present invention. More particularly, **FIG. 8** depicts an exemplary main control routine whose operation is begun at start **80** and first performs a general powerup initialization of hardware at step **81**. This process may include, among other things, a clearing of display **40** and any volatile microcontroller operating memory, and a check and display of current blender motor **25** temperature. Initialization step **81** may further include reset of any software programming flags used for control purposes to their chosen default state. A default powerup message may be displayed in step **82**, such as the manufacturer's name and the name and version of the drink program currently residing in base memory **70**.

[**0040**] Next the status of key socket **68** and any drink program memory card engaged therewith is examined in an exemplary key card test routine **120** shown in **FIG. 10**. (Circled letters presented in the flow chart figures designate points of interconnect between the figures.) More particularly, first the current loop connected to a conductor within key socket **68** is tested in step **121** to see if no drink program memory card **50** is mated therewith and if a first flag is set, signifying that a blend program has been copied between base memory **70** and the key card **50** currently engaged with key socket **68**. This test insures that a user may, where desired, recopy a drink program between base memory **70** and multiple key cards **50**, the latter of which may be used to distribute blend programs to other blenders. If both conditions are met, flag **1** is reset in step **122** before operation continues.

[**0041**] If both conditions are not met, or after flag one is reset, the current loop connected to a conductor within key socket **68** is tested in step **83** to see if drink program memory key card **50** is mated therewith and if a first flag is not set, signifying that a blend program has not been copied between base memory **70** and the key card currently engaged with key socket interface **68**. If so, the contents of its memory are selectively sampled in block **84** using any of the techniques well known to the skilled artisan to determine if the drink program data is in good condition. If so, the user is given an opportunity to copy blend programs between the drink program memory in key card **50** and base memory **70** in blender **10**. An exemplary copy select routine **125** by which this selection is made, is shown in **FIG. 11**.

[**0042**] Copy select routine **125** begins in step **126** with presentation on display **40** of a selection message such as "Press **1** to copy program to blender. Press **2** to copy program to media." In this instance if the user presses drink program **1** button **31**, the blend program currently resident in base memory **70** will be copied to the drink program memory in key card **50**, and if the user presses drink program **2** button **32**, the copy will be in the opposite direction. Of course, any button may be preselected and programmed to enter these choices, and the preselected buttons tested in steps **127** and **128** to ascertain the user's choice.

[**0043**] In the present example, if drink program **1** button **31** is found in step **127** to have been pressed, then in step **129** the blend program currently resident in base memory **70** is copied to the drink program memory in key card **50**, flag **1** is set and, as seen back in **FIG. 8, a** program "saved" message is presented on display **40** in step **88**. If neither drink program buttons **31** or **32** are pressed, no further action is taken and subsequent steps are presented back in **FIG. 8**. If drink program **2** button **32** is found in step **128** to have been pressed, then (again as seen back in **FIG. 8**) the data may be further checked in step **85**, again using any of the techniques well known to the skilled artisan to determine if the drink program data in key card **50** is the same as that currently in drink program base memory **70**. If not, a new drink program message may be presented on display **40** as shown in block **86**, the new drink program copied in step **87** from IC **51** in memory key card **50** to base memory **70**, and, in block **88**, a "saved" message displayed.

[0044] A "ready" message is displayed in step **90** if there is no key card **50** engaged with key socket **68** (step **83**), if the drink program data content of IC **51** in memory key card **50** is corrupt (step **84**), if the drink program in IC **51** is the same as the drink program in base memory **70** (step **85**), if the user elects to not copy the drink program by not pressing any preselected button (step **128**), or after a new drink program "saved" message has been displayed (step **88**).

[0045] Once the "ready" message is displayed, a user can perform any appropriate blender operation, such as selection and execution of one of the drink programs by pressing the corresponding button **31-36**, starting or stopping blender motor **25** operation with start/stop button **37**, adjusting the speed of blender motor **25** with speed change button **38**, or pulsing blender motor **25** with pulse button **39**. The desired scan key routines are performed in step **91**, and all buttons tested for actuation in step **92**. If a button is pressed, the user is given an opportunity to modify any drink mix characteristic or the ice content of any drink including ice, and to create new blend programs or blend program segments. An exemplary program routine **130** by which such modifications or creations are made, is shown in **FIG. 11**. In this routine the user sequentially selects the desired drink program, drink program segment, characteristic and magnitude of change.

[0046] Program routine **130** begins in step **131** with a test to determine whether the correct combination of buttons preselected to initiate the program routine have been pressed in the preselected manner. Requiring the user activation of two or more buttons consecutively will help minimize the accidental or inadvertent entry into program routine **130**, a desirable protection because this routine permanently alters blend programs and may not be suitable for operation by all users. Indeed, security may be further enhanced by inclusion of an additional button whose sole function is to allow entry into program routine **130** when pressed in sequence with other buttons having multiple functions. Mode select button **41** serves this function in the exemplary blender described herein.

[0047] If the correct combination of buttons preselected to initiate program routine **130** have not been pressed, but some other button has been pressed, then the selected routine is called and executed in step **93**, as seen back in **FIG. 8**. If no button is found actuated in step **92**, upon completion of the selected routine in step **93**, or upon completion of program routine **130**, the primary main control routine is repeated beginning with step **83**.

[0048] Returning to program routine **130** shown in **FIG. 11**, display **40** presents in step **132** an identification of the current drink program, drink program segment, and characteristic, such as segment motor speed, time, ramp rate or ice amount. Default selections may be presented until the user makes other choices by execution of program routine **130**. Next, scan key routines are executed in step **133** and the buttons tested in step **134**, as was performed in steps **91** and **92**, respectively. If no button has been pressed, the display is refreshed in step **132** and keys again tested until a button press is detected. If a button has been pressed, the button is tested in step **137** to ascertain whether it was one of the drink program buttons, signifying a user selection of a blend program to be modified or replaced. If not, then the user does not wish to perform a program change, and the primary main control routine is repeated beginning with key card test routine **120**.

[0049] Once a drink program button has been found to have been pressed in step **137**, display **40** is refreshed and presents in step **139** an identification of the current drink program, drink program segment, and characteristic. Having chosen the drink program to be modified, the user next selects a drink program segment. Buttons **31-36** maybe preselected to correspond to the segments in a particular drink program. Using the example of **FIG. 6**, there are four segments which may be chosen by pressing drink program buttons **1-4**, respectively. Thus, in step **140** drink program buttons **1-4** are tested. If none are pressed, operation returns to step **132**. However, if one of those buttons are pressed, display **40** is again refreshed and presents in step **141** an identification of the current drink program, drink program segment, and characteristic.

[0050] Having chosen the drink program and drink program segment to be modified, the characteristic to be modified or added is next entered. Keys are scanned in steps **142** and button presses tested in step **143** as performed in corresponding steps **133** and **134**. A toggle switch such as blender motor pulse button **39** may be conveniently used to scroll through and choose among the finite number of characteristics, and a test performed to see if that button has been pressed is performed in step **144**. If so, in step **145** the characteristic to be modified is changed to the new selection and presented on display **40**.

[0051] Next the magnitude and polarity of the characteristic change must be entered. Again, a toggle switch such as speed change button **38** may be conveniently used to "select" the desired characteristic by pushing up or down a number of times corresponding to the magnitude of the desired change or resulting characteristic. Button **39** is tested in block **147**. If pressed, after a preselected timeout period the characteristic may be incremented or decremented (step **148**) as called for by the user's actuation of button **39**, display **40** refreshed in step **141** and monitoring of keys for further characteristic changes resumed. If, after a preselected timeout period button **38** is not pressed, the characteristic, segment and program changes may all be saved to the desired memory such as base memory **70** (step **149**), and monitoring for further program changes in block **140** resumed.

[0052] Top-level flow charts for four exemplary operating routines included within the exemplary blender control shown in **FIG. 8**. are depicted in **FIG. 9**. Selection and execution of one of the drink programs (block **100**) is initiated by pressing the corresponding button **31-36** in step **101**. The chosen drink program is executed and selected program characteristics such as current motor speed and remaining time are displayed in step **102**. While the drink program is executing in block **103** a check is repeatedly made to determine if the user has selected another button to override the remainder of the drink program. If so, the drink program is stopped in step **104**. Thereafter, and when the drink program is finished, the "ready" message is displayed in step **105**, and program execution returns (block **106**) to the main program.

[0053] The user may also elect to perform a manual blend cycle or a pulse blend cycle by pressing the appropriate user

interface **24** button. In those events, the corresponding routine is respectively called in steps **110** and **111**, and performed in steps **112** and **113**. The user may also elect to restore the default drink program from microcontroller memory **63** to drink program base memory **70**, again by pressing the appropriate user interface **24** button. In that event, the corresponding routine is called in step **115**, and the copy performed in step **116** followed by the display of a "saved" message in step **117**.

[**0054**] Several variations and modifications should now be evident to or understood by the skilled artisan. For example, a drink program may have as few as one or as many segments as is required for production of the drink for which the program was created. Also, in the embodiment of the programmed blender control **10** described herein, drink programs selected for execution by the user are in nonvolatile memory on microcomputer board **60**. However, while not presently preferred, processor **62** may execute drink programs directly from a source external to microcontroller board **60**, such as the drink program memory key card **50**. In this instance microcontroller memory **63** and base memory **70** may be eliminated. Of course, if the external source becomes unavailable, blender **20** would operate only manually.

[**0055**] It will likewise be appreciated that the interface between microcontroller board **60** and the drink program memory may be made by any means, wired or wireless, capable of transferring the blend programs. Additional examples of suitable wired interfaces that could be employed instead of or in addition to an edge connector are an RJ-type telephonic connection or a fiber optic, optical connection. Infrared, radio frequency or other wireless interfaces also may be substituted for or added to key socket **68**.

[**0056**] Inasmuch as the present invention is subject to variations, modifications and changes in detail, some of which have been expressly stated herein, it is intended that all matter described throughout this entire specification or shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense. It should thus be evident that a device constructed according to the concept of the present invention, and reasonably equivalent thereto, will accomplish the objects of the present invention and otherwise substantially improve the art of programmable blenders.

1. A programmable blender for executing a blend program, comprising:

a blending assembly for blending ingredients;

memory including a first blend program having a plurality of operating segments with variable blend program operating characteristics;

input means for user selection of a first operating characteristic to be modified and the modification magnitude; and,

a processor receiving said blend program from said memory and said user selection from said input means, modifying said first operating characteristic in accordance with said user selection, and controlling operation of said blending assembly in accordance with said modified blend program.

2. A programmable blender, as set forth in claim 1, wherein said memory is nonvolatile and said processor saves said modified blend program to said memory.

3. A programmable blender as set forth in claim 1, wherein said memory includes a plurality of blend programs, said Input means includes input means for user selection of a blend program stored in memory, and said processor receives said selected blend program.

4. A programmable blender, as set forth in claim 3, wherein said input means includes input means for user selection of a blend program stored in memory having said first operating characteristic.

5. A programmable blender, as set forth in claim 3, wherein a first operating segment includes said operating characteristic to be changed, and said input means includes input means for user selection of said first operating segment.

6. A programmable blender, as set forth in claim 5, wherein said input means includes a plurality of pushbuttons.

7. A programmable blender, as set forth in claim 6, wherein said input means further includes a first pushbutton and a second pushbutton, said processor testing for user activation of said first pushbutton and said second pushbutton in a preselected manner prior to user selection of said first operating characteristic.

8. A programmable blender, as set forth in claim 7, further including a display presenting said first blend program, said first operating segment and said operating characteristic.

9. A blender for executing a blend program, comprising:

a blending assembly for blending ingredients;

a first memory resident in the blender for storing a blend program;

a second memory in operative association with the blender for storing said blend program; and,

a processor resident in the blender receiving said blend program and selectively copying said blend program from said first memory to said second memory and from said second memory to said first memory.

10. A blender, as set forth in claim 9, further including input means for user selection of the direction said blend program is to be copied between said first memory and said second memory, said processor receiving said user selection from said input means and copying said blend program in accordance with said user selection.

11. A blender, as set forth in claim 10, wherein said second memory is a memory media for distribution of said blend program to another blender.

12. A programmable blender for executing a blend program, comprising:

a blending assembly for blending ingredients;

a first memory resident in the blender for storing a blend program;

a second memory in operative association with the blender for storing said blend program, one of said first memory and said second memory including a first blend program having a plurality of operating segments with variable blend program operating characteristics;

input means for user selection of a first operating characteristic to be modified and the modification magnitudes; and,

a processor resident in the blender receiving said first blend program from one of said first memory and said second memory and receiving said user selection from said input means, modifying said first operating characteristic in accordance with said user selection, selectively copying said blend program from said first memory to said second memory and from said second memory to said first memory, and controlling operation of said blending assembly in accordance with said modified blend program.

13. A programmable blender, as set forth in claim 12, wherein said memory is nonvolatile and said processor saves said modified blend program to said memory.

14. A programmable blender as set forth in claim 12, wherein said memory includes a plurality of blend programs, said input means includes input means for user selection of a blend program stored in memory, and said processor receives said selected blend program.

15. A programmable blender, as set forth in claim 14, wherein said input means includes input means for user selection of a blend program stored in memory having said first operating characteristic.

16. A programmable blender, as set forth in claim 14, wherein a first operating segment includes said operating characteristic to be changed, and said input means includes input means for user selection of said first operating segment.

17. A programmable blender, as set forth in claim 16, wherein said input means includes a plurality of pushbuttons.

18. A programmable blender, as set forth in claim 17, wherein said input means further includes a first pushbutton and a second pushbutton, said processor testing for user activation of said first pushbutton and said second pushbutton in a preselected manner prior to user selection of said first operating characteristic.

19. A programmable blender, as set forth in claim 18, further including a display presenting said first blend program, said first operating segment and said operating characteristic.

20. A programmable blender, as set forth in claim 12, further including input means for user selection of the direction said blend program is to be copied between said first memory and said second memory, said processor receiving said user selection from said input means and copying said blend program in accordance with said user selection.

21. A programmable blender, as set forth in claim 20, wherein said second memory is a memory media for distribution of said blend program to another blender.

* * * * *