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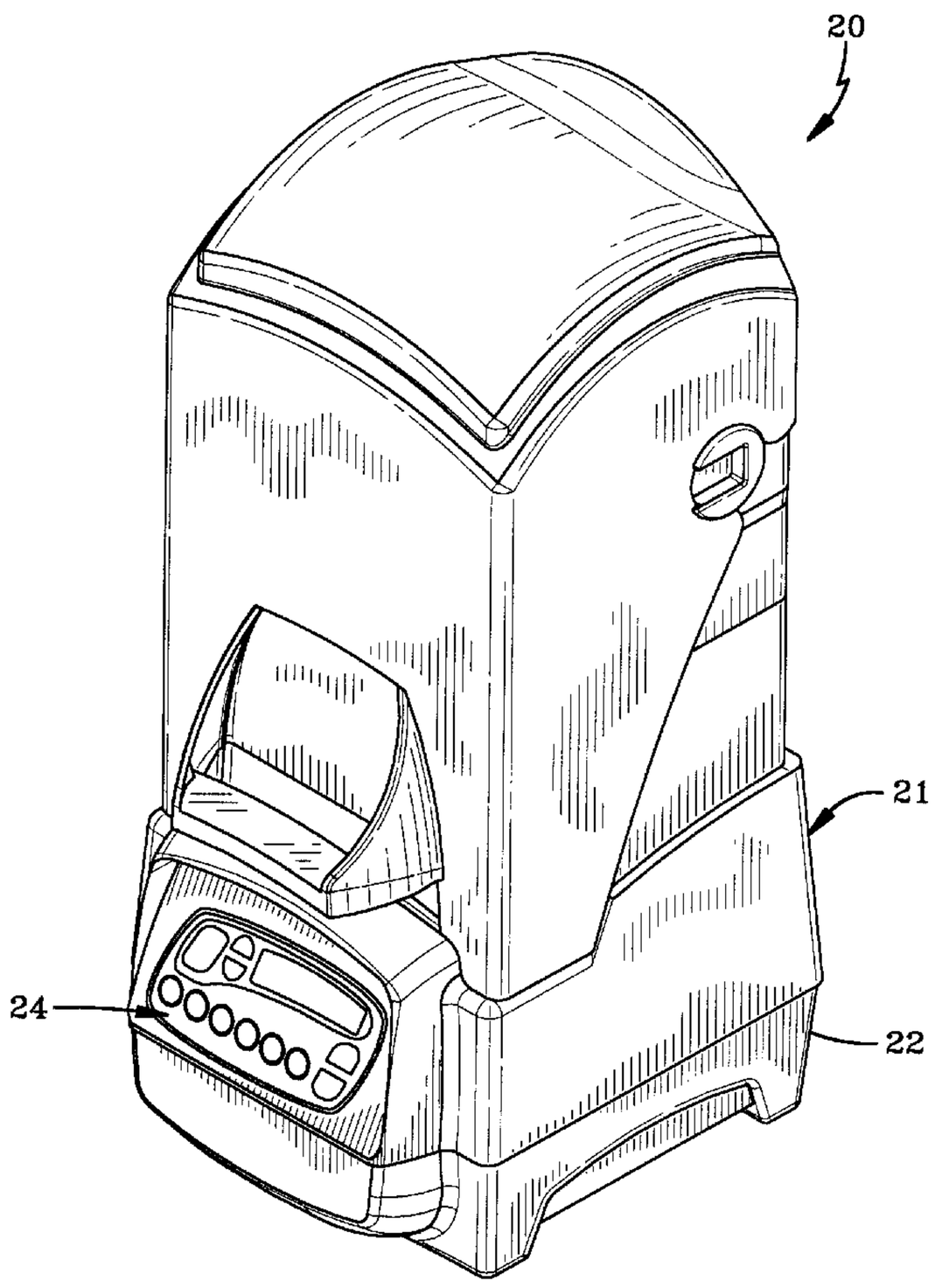
(54) **MELANGEUR PROGRAMMABLE PAR L'UTILISATEUR**

(54) **FIELD PROGRAMMABLE BLENDER**



(57) A programmable drink blender (20) whose programming can be loaded by the user in the field, includes a blender motor (25), a user interface and display (24) including a plurality of buttons (30) for user selection of a desired blend program, a base memory (70) storing a first plurality of blend programs, a key card (50) having a memory including a second plurality of blend programs, a socket (68) receiving the key card (50), and a processor (62) for controlling blender motor (25) in accordance with any selected blend program. Whenever the user wishes to change the blend programs stored in base memory (70), the user inserts key card (50) into socket (68), and processor (62) automatically detects its presence, verifies that the second plurality of blend programs is not corrupt or the same as the first plurality of blend programs, and copies the second plurality of blend programs from the memory in key card (50) to base memory (70). Thereafter, the second plurality of blend programs are available to the user from buttons (30).

ABSTRACT OF THE DISCLOSURE

A programmable drink blender (20) whose programming can be loaded by the user in the field, includes a blender motor (25), a user interface and display (24) including a plurality of buttons (30) for user selection of a desired blend program, a base memory (70) storing a first plurality of blend programs, a key card (50) having a memory including a second plurality of blend programs, a socket (68) receiving the key card (50), and a processor (62) for controlling blender motor (25) in accordance with any selected blend program. Whenever the user wishes to change the blend programs stored in base memory (70), the user inserts key card (50) into socket (68), and processor (62) automatically detects its presence, verifies that the second plurality of blend programs is not corrupt or the same as the first plurality of blend programs, and copies the second plurality of blend programs from the memory in key card (50) to base memory (70). Thereafter, the second plurality of blend programs are available to the user from buttons (30).

FIELD PROGRAMMABLE BLENDER

TECHNICAL FIELD

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 and changed by the user.

BACKGROUND ART

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.

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.

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.

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 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.

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.

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 that appear to read information encoded on a magnetic strip adhered to a plastic card, much the same as an Automated Teller Machine reads information off a credit card.

Magnetic strip credit cards have a number of well known limitations, foremost of which may be their lack of security, and susceptibility to physical and magnetic damage. For example, the magnetically encoded information is easily corrupted or destroyed by magnetic and electromagnetic fields. Also, the magnetically encoded information can be easily read and modified by any of the multitude of magnetic strip card readers widely commercially available, making it difficult for commercial drink vendors to protect proprietary drink formulations. Magnetic strip credit cards have limited memory capacity which may be inadequate for drink program information, and also generally are not automatically recognized by the equipment with which they are used, but instead require the user to manually alert the equipment to the presence of the credit card.

SUMMARY OF THE INVENTION

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.

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 in a secure and cost effective manner.

It is still another object of the present invention to provide an appliance, as set forth above, which automatically replaces the desired existing blend programs with new blend programs promptly upon presentation by the user without additional interaction by the user.

It is yet another object of the present invention to provide an appliance, as set forth above, which verifies the condition of the new blend programs before replacing the old blend programs, and only effects such replacement if the new blend programs are not corrupt.

It is a further object of the present invention to provide an appliance, as set forth above, which allows the user to restore the existing blend programs in the event of loss of the same.

It is still a further object of the present invention to provide an appliance, as set forth above, in which new blend programs to be transferred to the appliance are protected from damage by magnetic and electromagnetic radiation.

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.

In general, a programmable blender for executing a user selected blend cycle includes a motor for blending ingredients, a base memory including a first plurality of blend programs, a key card having a key memory including a second plurality of blend programs, a socket for receiving the key card, input means for entry of a blend program selection from the first plurality of blend programs, and, a processor. The processor receives the first plurality of blend programs from the base memory and the blend program selection from the input means, controls operation of the motor in

accordance with the selected blend program; monitors the socket for receipt of the key card and, upon receipt thereof, copies the second plurality of blend programs to the base memory.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an exemplary blender in accordance with the present invention.

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.

Fig. 3 is a bottom view of the blender lower housing, depicting a slot for the insertion of a drink program memory key card.

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.

Fig. 5 is a top view of an exemplary drink program memory key card in accordance with the present invention.

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.

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.

Fig. 8 is a top-level flow chart of an exemplary blender control program in accordance with the present invention.

Fig. 9 is a top-level flow chart of four exemplary operating routines included within the exemplary blender control shown in Fig. 8.

PREFERRED EMBODIMENT FOR CARRYING OUT THE INVENTION

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 blender motor 25 (seen in Fig. 7).

User interface and display 24, best shown in Fig. 2, includes a plurality of numbered momentary pushbuttons (hereinafter referred to as "buttons") 30 for the selection of drink programs stored in blender memory (individually referred to as buttons 31 - 36), a start/stop button 37, a speed change button 38, a blender motor pulse button 39, and a display 40. 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.

Fig. 5 presents a top view of an exemplary drink program memory key card in accordance with the present invention, indicated generally by the numeral 50. 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 5/8 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.

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 20 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.

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 operating characteristics. The speed of blender motor 20 is increased from zero at time zero to some preselected first velocity at time t_1. Blender motor 20 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 20 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.

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.

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.

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 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.

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. 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.

Next 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. 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 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.

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), or after a new drink program "saved" message has been displayed (step 88).

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 selected routine is called and executed in step 93. If no button is found actuated in step 92, or upon completion of the selected routine in step 93, the primary main control routine is repeated beginning with step 83.

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.

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.

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.

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.

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.

CLAIMS:

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

a motor for blending ingredients;

a base memory including at least a first blend program;

a key card having a key memory including at least a second blend program;

an interface for receiving said second blend program from said key card; and,

a processor for receiving said first blend program from said base memory, controlling operation of said motor in accordance with said selected blend program; monitoring said interface for receipt of said second blend program from said key card and upon receipt thereof copying said second blend program to said base memory.

2. A programmable blender, as set forth in claim 1, wherein said base memory includes a first plurality of blend programs, and further including input means for entry of a blend program selection from said first plurality of blend programs, wherein said processor receives said first plurality of blend programs from said base memory and said blend program selection from said input means, controls operation of said motor in accordance with said selected blend program, and, upon receipt by said interface of said key card, copying said second plurality of blend programs to said base memory.

3. A programmable blender, as set forth in claim 2, wherein said interface is a socket, and when said socket receives said key card said processor verifies that said second plurality of blend programs is not corrupt.

4. A programmable blender, as set forth in claim 3, wherein when said processor verifies that said second plurality of blend programs is not corrupt, said processor compares said second plurality of blend programs with said first plurality of blend programs, and when the same, does not copy said second plurality of blend programs to said base memory.

5. A programmable blender, as set forth in claim 4, wherein said key memory is

an integrated circuit carried on a printed circuit board.

6. A programmable blender, as set forth in claim 4, wherein said first plurality of blend programs and said second plurality of blend programs each include programs for a plurality of blend cycle operations having different motor operating characteristics.

7. A programmable blender, as set forth in claim 6, wherein said different motor operating characteristics include at least one of motor speed, ramp rate and operation duration.

8. A programmable blender, as set forth in claim 7, further including a microcontroller, said processor included in said microcontroller, and said microcontroller further including microcontroller memory having a copy of said first plurality of blend programs stored therein.

9. A programmable blender, as set forth in claim 8, wherein said processor selectively restores said first plurality of blend programs from said microcontroller memory to said base memory.

10. A programmable blender, as set forth in claim 9, wherein said first plurality of blend programs and said second plurality of blend programs are programs for the blending of drinks.

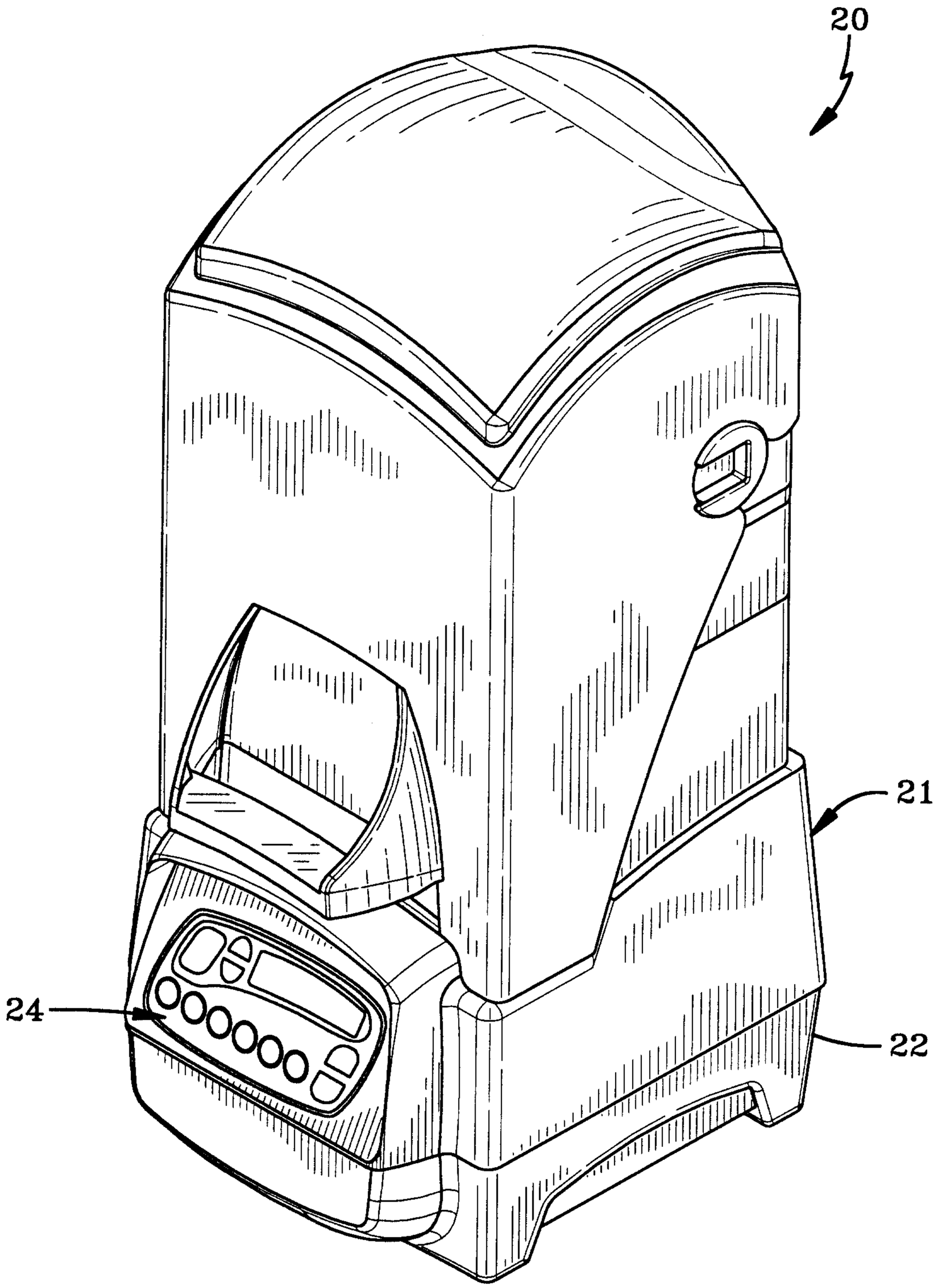
11. A programmable blender for executing a user selected blend program, comprising:

a motor for blending ingredients;

a source external to said blender of the user selected blend program;

an interface for receiving said user selected blend program from said source; and,

a processor for receiving said user selected blend program from said interface and controlling operation of said motor in accordance with the user selected blend program.



FIG–1

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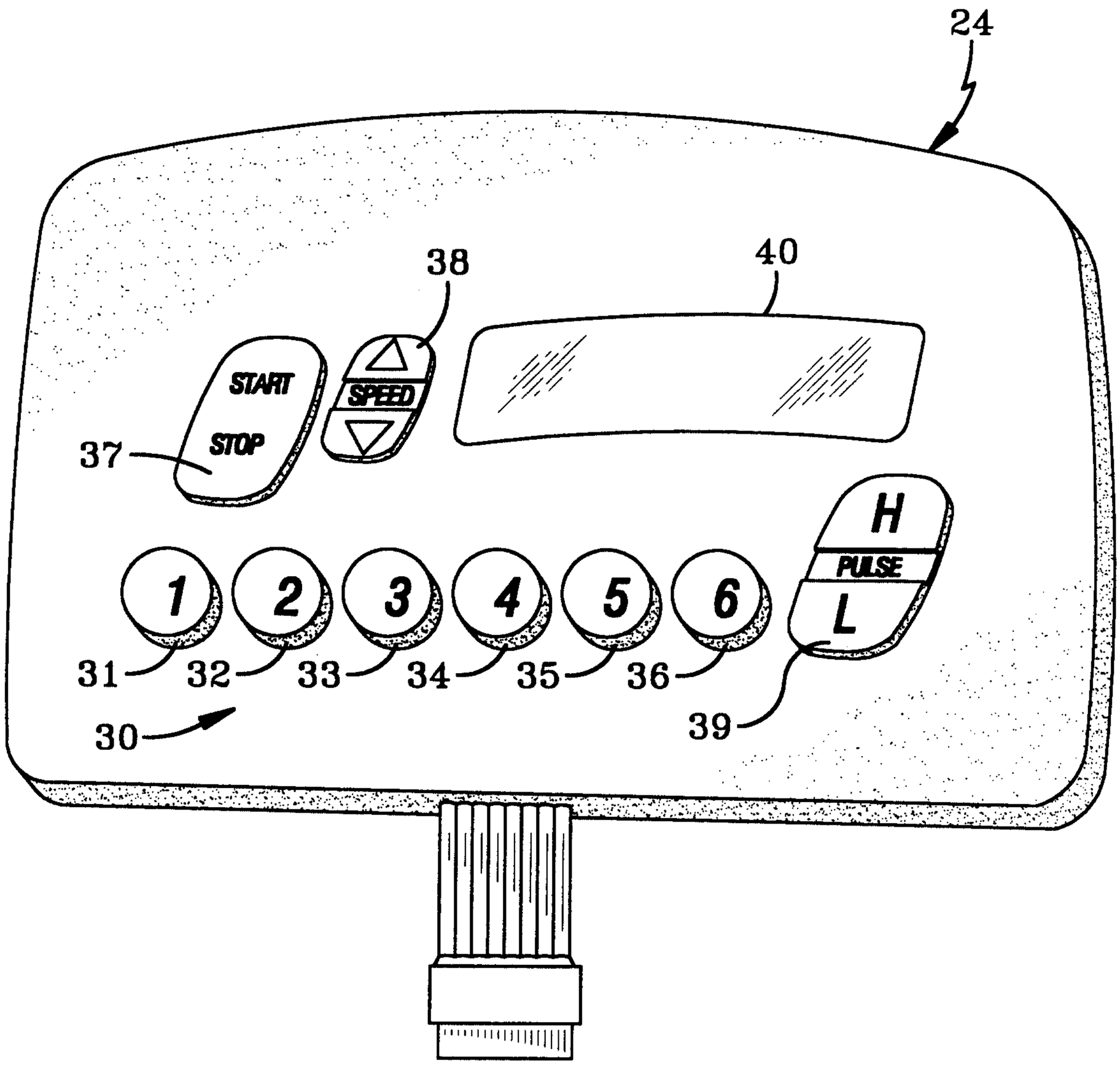
24
38
40
START
SPEED
STOP
37
H
PULSE
L
1
2
3
4
5
6
31
32
33
34
35
36
30
39

FIG-2

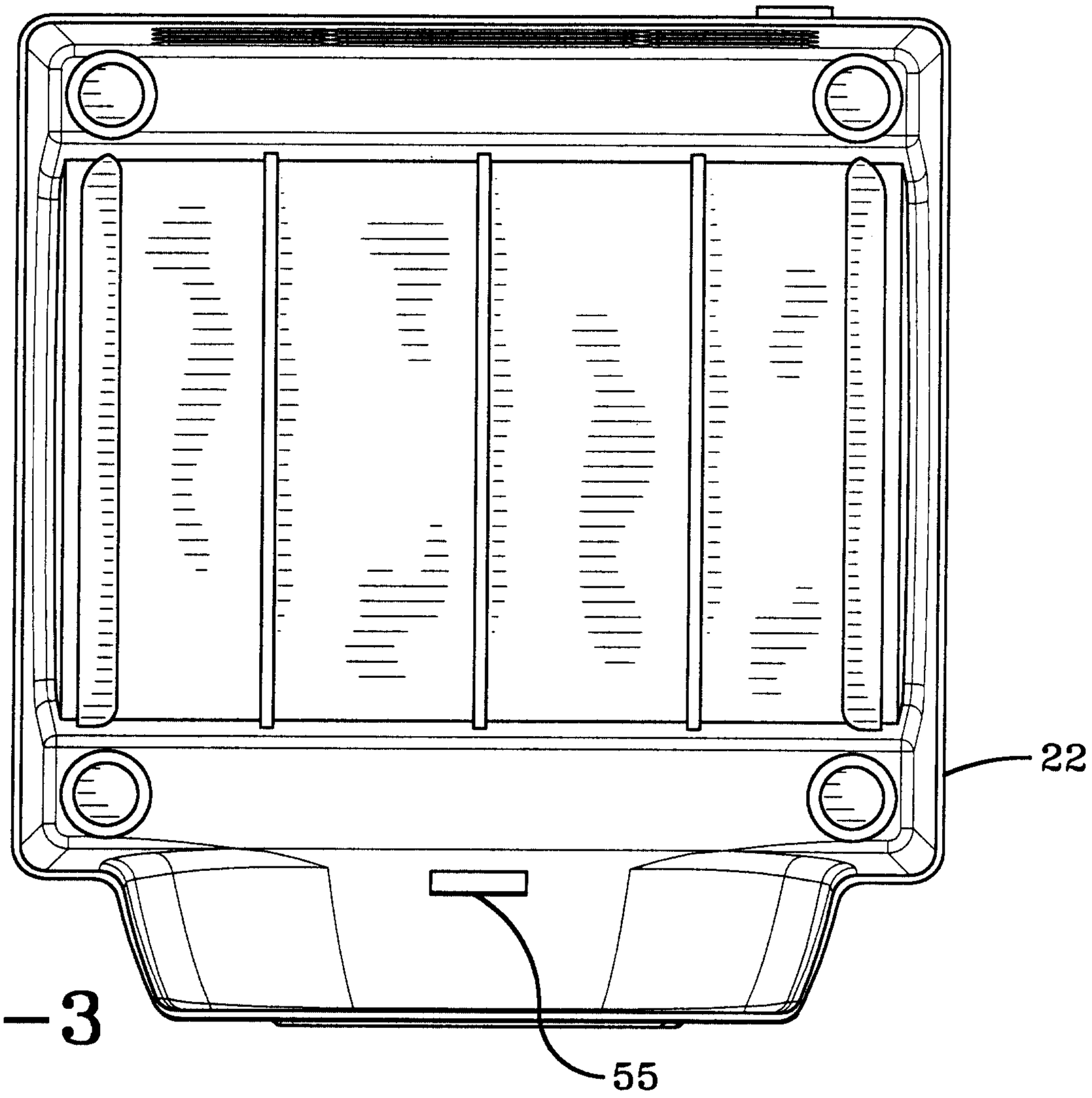

FIG-3

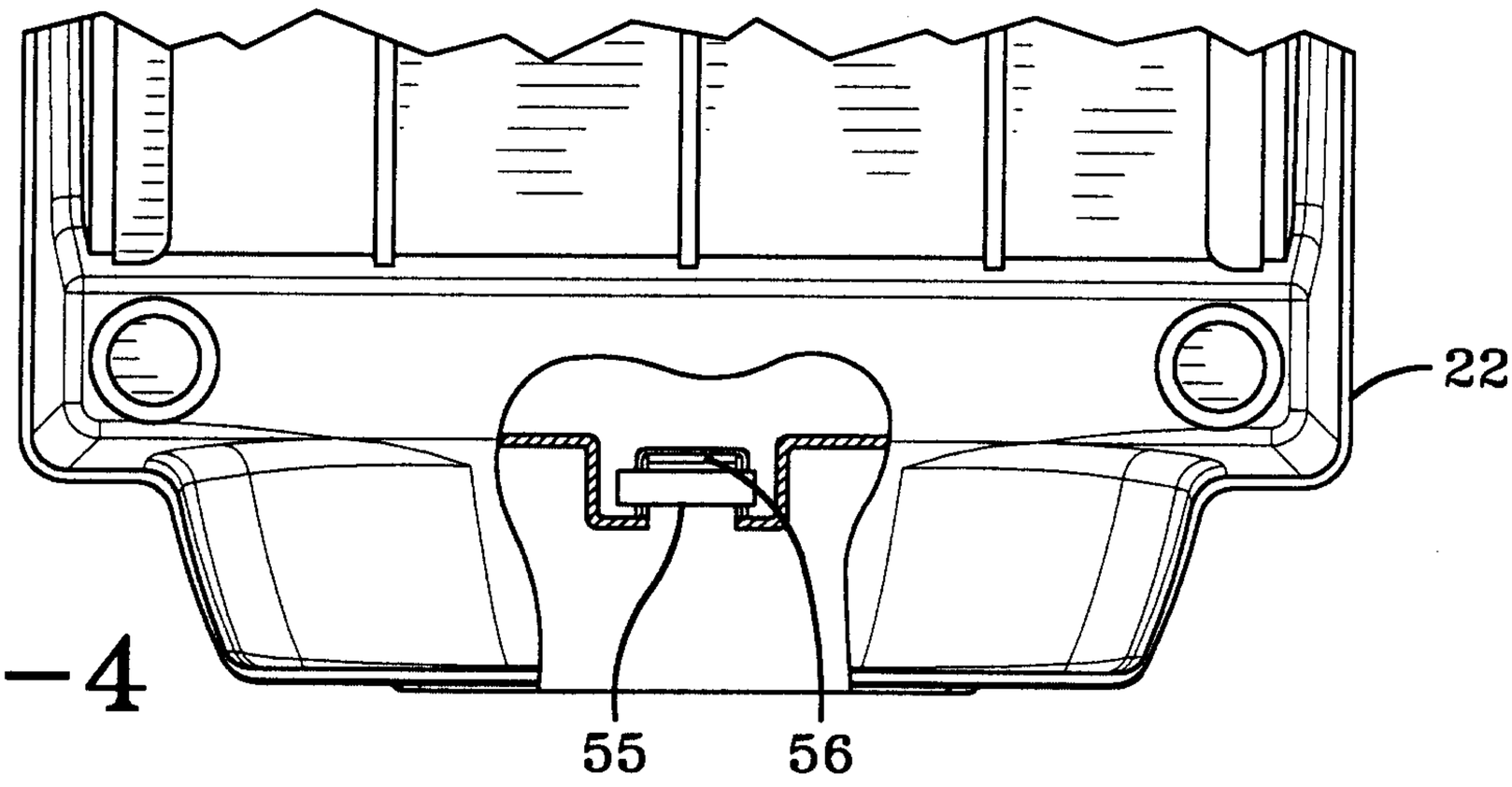

FIG-4

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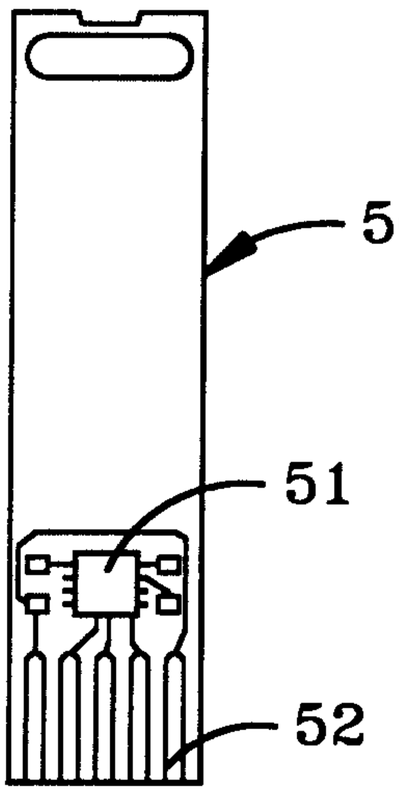

50
51
52

FIG-5

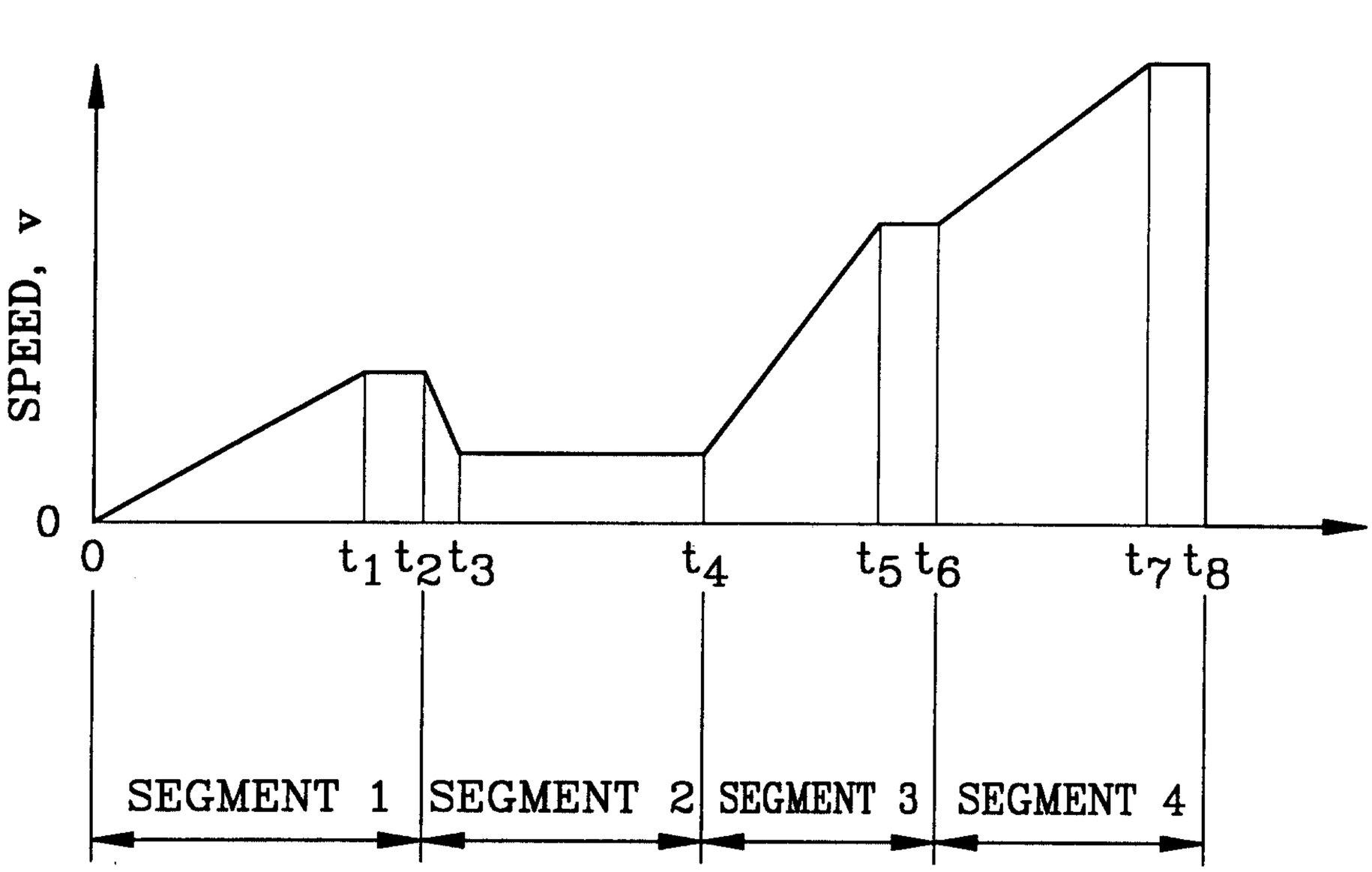
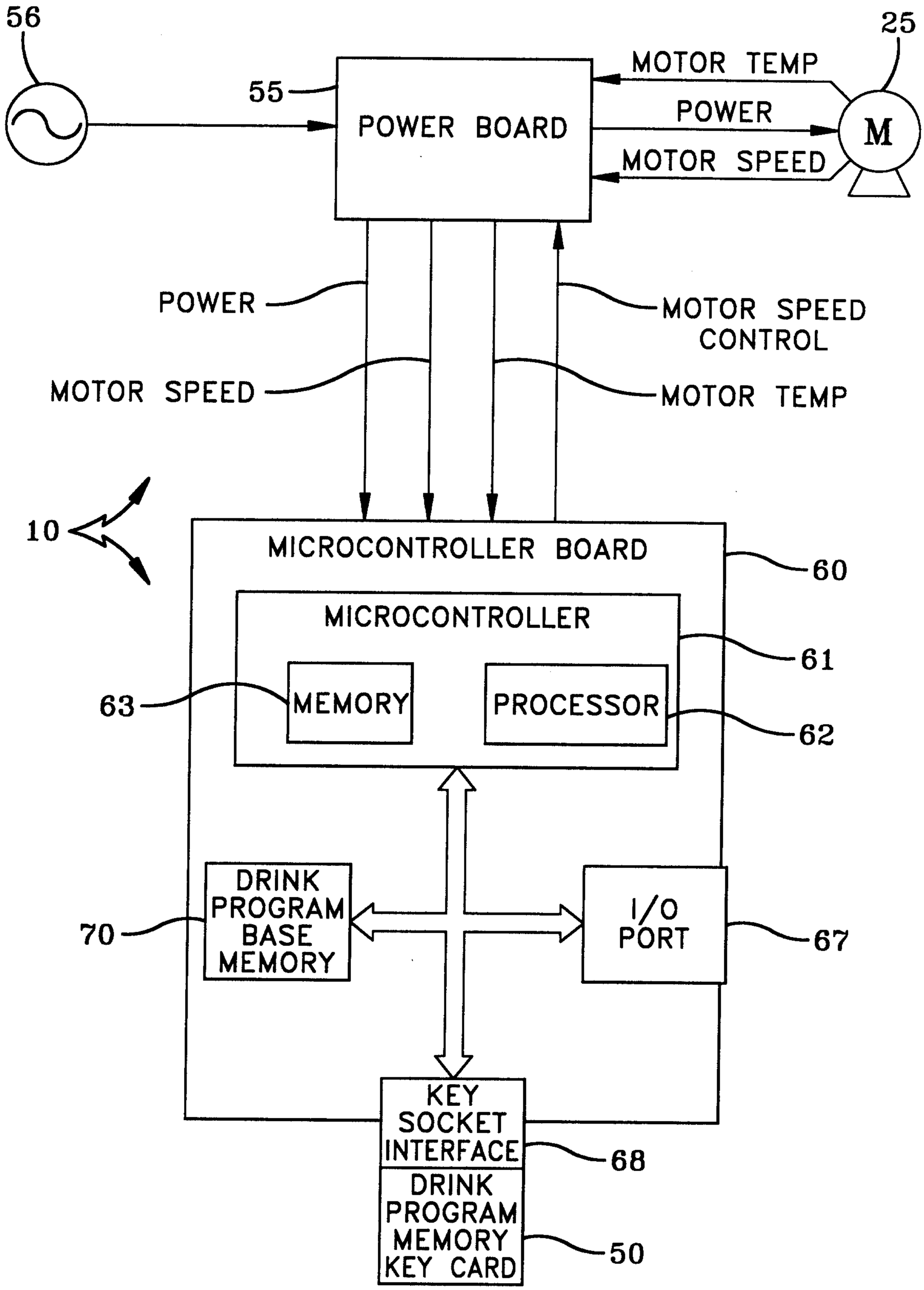
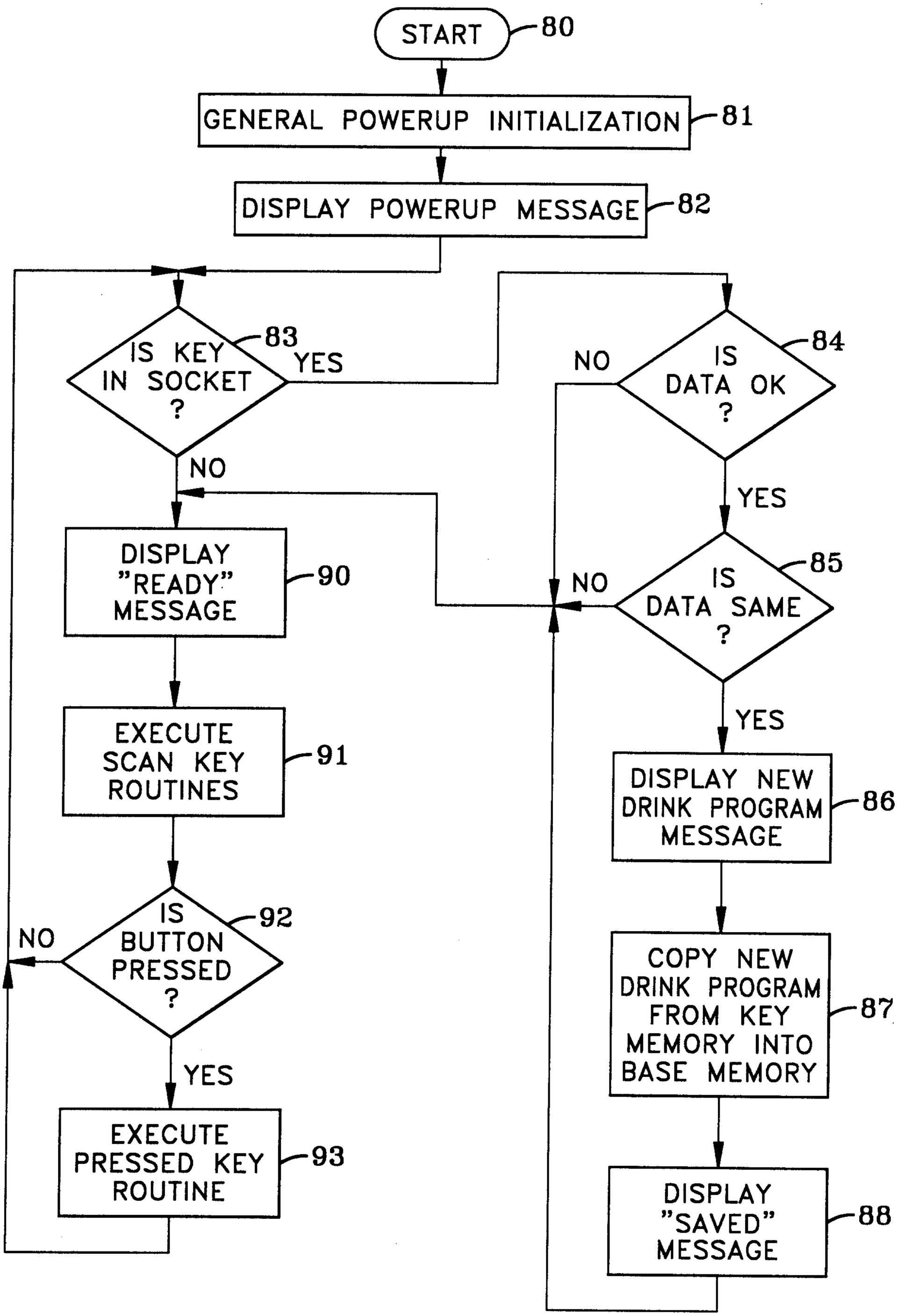

SPEED, v
0
0
t_1 t_2 t_3
t_4
t_5 t_6
t_7 t_8
SEGMENT 1
SEGMENT 2
SEGMENT 3
SEGMENT 4
TIME, t

FIG-6


56
55
POWER BOARD
25
MOTOR TEMP
POWER
M
MOTOR SPEED
POWER
MOTOR SPEED CONTROL
MOTOR SPEED
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



FIG–8

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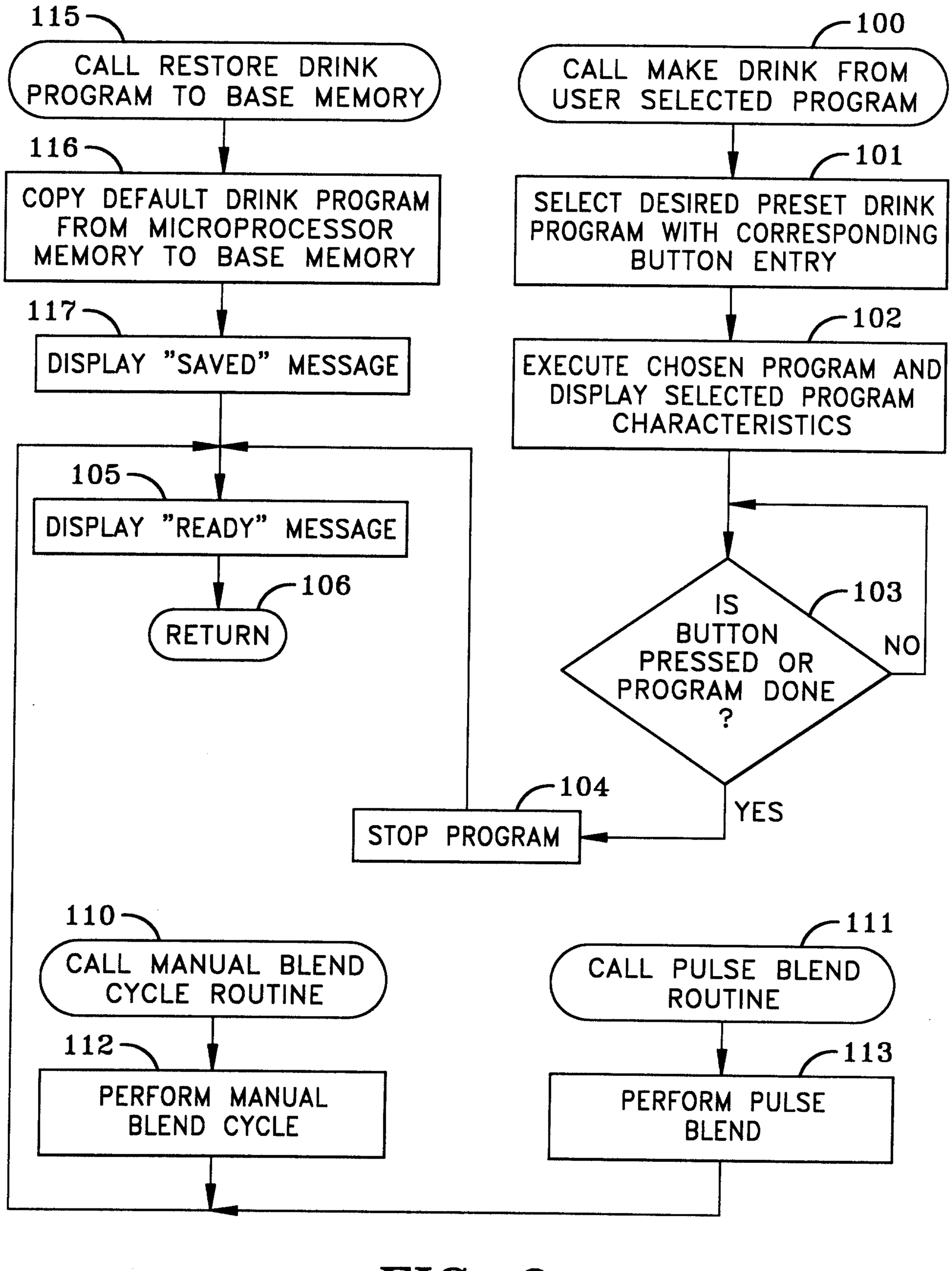
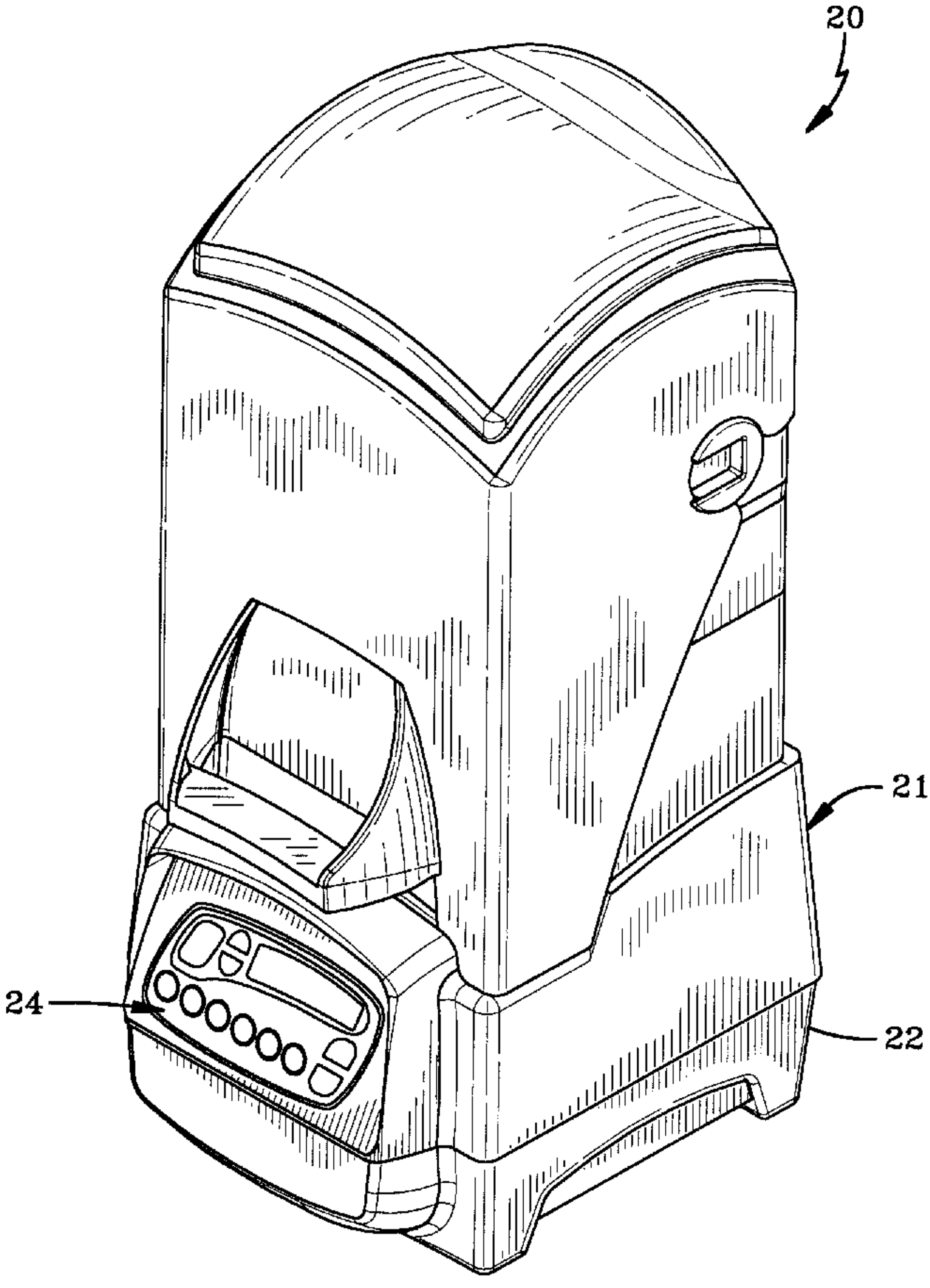

115
CALL RESTORE DRINK PROGRAM TO BASE MEMORY
116
COPY DEFAULT DRINK PROGRAM FROM MICROPROCESSOR MEMORY TO BASE MEMORY
117
DISPLAY "SAVED" MESSAGE
105
DISPLAY "READY" MESSAGE
106
RETURN
100
CALL MAKE DRINK FROM USER SELECTED PROGRAM
101
SELECT DESIRED PRESET DRINK PROGRAM WITH CORRESPONDING BUTTON ENTRY
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


20
21
22
24