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DEVICE FOR SENSING AND BLOCKING FROTH IN A HOME MACHINE FOR  
MANUFACTURING SOYBEAN MILK, WATERY BEAN CURD, AND BEAN CURD

BACKGROUND OF THE INVENTION

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Field of the invention

The present invention relates to a device for sensing and  
blocking froth in a home machine for manufacturing soybean  
milk, watery bean curd, and bean curd, and more particularly to  
10 a device for sensing and blocking froth in a home machine for  
manufacturing soybean milk, watery bean curd, and bean curd,  
which allows a heater not to be operated only when the home  
manufacturing machine contains froth, so as to remove froth,  
thereby preventing the machine from getting damaged.

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Description of the Prior Art

A conventional method for domestic use which manufactures  
soybean milks, watery bean curds, and bean curds will be  
described herein below.

20 First, the soybeans are washed clean. The washed beans  
are then soaked and made swollen in the water for several hours  
to be easily pulverized. The swollen beans are pulverized by  
using a millstone or a mixer, so that raw bean juice is  
produced. The raw bean juice is divided into bean-curd refuse  
25 and protein juice using a fine sieve gin or cloth. The divided

protein juice is put in a kettle or a receptacle and boiled. At this time, since froth inevitably forms and causes the kettle or receptacle to overflow, the protein juice is boiled while repeatedly and artificially adjusting thermal power with  
5 care so that the froth does not overflow. After boiling the protein juice enough, an addition such as sugar or salt is put in the boiled protein juice to manufacture potable soybean milk. Also, after boiling the protein juice enough, a predetermined amount of coagulating agent such as calcium  
10 sulfate or the like is added to the boiled protein juice. After the coagulating agent-added protein juice is stirred, when several minutes elapse, it becomes a watery bean curd. The watery bean curd is put in a forming device and compressed and formed to manufacture bean curd.

15 However, in the conventional method for domestic use which manufactures soybean milks, watery bean curds, and bean curds, since several processes are separately performed, it is inconvenient. Since the manufacturing process is complicated and it takes a lot of time, the conventional method is  
20 inefficient. In particular, it takes a lot of time to make the beans swell. It is difficult to suitably adjust the amount of beans. The recovery rate of the protein juice is relatively low and it is difficult to manage a clean status.

In order to solve such problems, apparatuses capable of  
25 simply and conveniently manufacturing soybean milks, watery

bean curds, and bean curds are proposed. Hereinafter, such conventional apparatus for domestic use which manufactures soybean milks, watery bean curds, and bean curds will be described with reference to FIG. 1.

5        FIG. 1 is a sectional view for showing a conventional apparatus for domestic use which manufactures soybean milks, watery bean curds, and bean curds. As shown in FIG. 1, the conventional apparatus includes a body 1, a driving motor 2, a short driving shaft 3, a long driving motor 4, a knife edge 5,  
10 a heater 6, and a temperature sensor 7. A cover is installed at a upper portion of the body 1. The body 1 is opened and closed by the cover. The driving motor 2 is installed at the cover of the body 1. When a power is applied to the driving motor 2, the driving motor 2 provides a rotating power. The  
15 short driving shaft 3 serves as a rotary shaft of the driving motor 2. The long driving motor 4 is detachably fitted to the shorter driving motor 3. The knife edge 5 is connected to an end portion of the long driving motor 4. The heater 6 heats contents included in the body 1. The temperature sensor 7  
20 senses a heating temperature of the contents included in the body 1.

An operation of the conventional apparatus for domestic use which manufactures soybean milks, watery bean curds, and bean curds will now be explained.

25        When a user puts beans and water into the interior of the

body 1 and inputs a power to a controller(not shown), the controller operates the driving motor 2. Then the driving motor 2 controls the knife edge 5 to pulverize the beans and water. The controller operates the heater 6 and the  
5 temperature sensor 7 to perform a series of processes, in which the beans and water are heated at a predetermined temperature, so that the soybean milks, watery bean curds, and bean curds are sequentially manufactured.

However, in the conventional apparatus for domestic use  
10 which manufactures soybean milks, watery bean curds, and bean curds, if a user operates the conventional apparatus in a state in which the froth forms and overflow during manufacturing process, the contents included in the body are spoilt and the conventional apparatus gets damaged.

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#### SUMMARY OF THE INVENTION

Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an  
20 object of the present invention is to provide a device for sensing and blocking froth in a home machine for manufacturing soybean milk, watery bean curd, and bean curd, which allows a heater not to be operated only when the home manufacturing machine contains froth, so as to remove the occurrence of  
25 froth, thereby preventing the machine from getting damaged.

In order to accomplish this object, there is provided a device for sensing and blocking froth in an apparatus for manufacturing soybean milk, watery bean curd, and bean curd, the apparatus being in domestic use, the apparatus including a plurality of components installed in a body, the device comprising: a ground electrode and a signal electrode electrically connected to two selected in the plurality of the components, respectively; a first resistor connected to the signal electrode; a first switching transistor connected to the first resistor; a controller connected to the first switching transistor for outputting a control signal for blocking a froth when the froth is sensed; a second resistor connected to the controller; a second switching transistor connected to the second resistor; a heater coil connected to the second switching transistor; and a third switching transistor connected to the second switching transistor.

In this case, the ground electrode and the signal electrode may be electrically connected to a heater and a temperature sensor.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying

drawings, in which:

FIG. 1 is a sectional view for showing a conventional apparatus for domestic use which manufactures soybean milks, watery bean curds, and bean curds;

5        FIG. 2 is a circuitry diagram which shows a device for sensing and blocking froth in a home machine for manufacturing soybean milk, watery bean curd, and bean curd according to an embodiment of the present invention; and

FIG. 3 is a sectional view for showing a device having two  
10 electrodes which are electrically connected to a heater and a short driving shaft, respectively, which senses froth in soybean milk, watery bean curd, and bean curd manufacturing apparatus for domestic use and generates an block signal indicative of the sensed result according to the present  
15 invention;

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, a preferred embodiment of the present  
20 invention will be described with reference to the accompanying drawings. In the following description and drawings, the same reference numerals are used to designate the same or similar components, and so repetition of the description on the same or similar components will be omitted.

25        A device for sensing the froth in soybean milk, watery

bean curd, and bean curd manufacturing apparatus for domestic use and generating a blocking signal indicative of the sensed result will be explained herein referring to FIG. 2 below. FIG. 2 is a circuitry diagram which shows the device for  
5 sensing and blocking froth in a home machine for manufacturing soybean milk, watery bean curd, and bean curd according to an embodiment of the present invention.

As shown in FIG. 2, the device includes a ground electrode E1, a signal electrode E2, a resistor R28, a switching  
10 transistor Q10, a controller I.C1, a resistor R8, a switching transistor Q4, a heater coil Ra and a switching transistor Q6. The ground electrode E1 and the signal electrode E2 are connected to two selected in components installed in a body 1, respectively. The resistor R28 is connected to the signal  
15 electrode E2. The switching transistor Q10 is connected to the resistor R28. The controller I.C1 is connected to the switching transistor Q10. The controller I.C1 outputs a control signal for blocking froth when the froth is sensed. The resistor R8 is connected to the controller I.C1. The  
20 switching transistor Q4 is connected to the resistor R8. The heater coil Ra is connected to the switching transistor Q4. The switching transistor Q6 is connected to the switching transistor Q4.

Hereinafter, an operation of the device for sensing and  
25 blocking froth in a home machine for manufacturing soybean

milk, watery bean curd, and bean curd according the present invention will be described.

When a user puts beans and water into the interior of the body 1 and inputs a power to a controller I.C1, the controller  
5 I.C1 operates the driving motor 2. Then the driving motor 2 controls the knife edge 5 to pulverize the beans and water. The controller operates the heater 6 and the temperature sensor 7 to perform a series of processes, in which the beans and water are heated at a predetermined temperature, so that the  
10 soybean milks, watery bean curds, and bean curds are sequentially manufactured.

When the heater 6 is operated during manufacturing process of soybean milks, watery bean curds, and bean curds, the controller I.C1 judges whether or not froth is generated in the  
15 interior of the body 1 in response to a signal inputted from the signal electrode E2 through the resistor R28 and the switching transistor Q10.

When the froth is present in the interior of the body 1, the ground electrode E1 and the signal electrode E2 are  
20 electrically connected to each other by means of the froth. Accordingly, a ground electric potential is applied to a base of the switching transistor Q10 to turn off the switching transistor Q10. When the froth is absent in the interior of the body 1, the ground electrode E1 and the signal electrode E2  
25 are electrically disconnected from each other. Accordingly, a

non-ground electric potential is applied to the base of the switching transistor Q10 to turn on the switching transistor Q10.

The ground electrode E1 and the signal electrode E2 are used in connection to two selected components installed in the body, respectively. FIG. 3 shows device having the ground electrode E1 and the signal electrode E2 which are electrically connected to two selected components in the body 1. As shown in FIG. 3, the ground electrode E1 and the signal electrode E2 which are electrically connected to a heater 6 and a temperature sensor 7 respectively.

When the froth is present between the ground electrode E1 and the signal electrode E2, the switching transistor Q10 is turned off. Accordingly, the controller I.C1 drives the switching transistor Q4 connected to an output terminal of the controller I.C1. The switching transistor Q4 drives and does not operate the heater coil Ra inserted into the heater 7 to remove the occurrence of the froth.

As mentioned above, the present invention can provide an apparatus for sensing and blocking froth is present in a machine for manufacturing soybean milk, a watery bean curd, and a bean curd, which allows a heater not to be operated only when the home manufacturing machine contains froth, thereby preventing the machine from getting damaged. The present invention can be applied and used in an apparatus field which

manufactures soybean milks, watery bean curds, and bean curds, without departing from the scope and spirit of the invention.

Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

WHAT IS CLAIMED IS:

1. A device for sensing and blocking froth in an apparatus for manufacturing soybean milk, watery bean curd, and  
5 bean curd, the apparatus being in domestic use, the apparatus including a plurality of components installed in a body, the device comprising:

a ground electrode and a signal electrode electrically connected to two selected in the plurality of the components,  
10 respectively;

a first resistor connected to the signal electrode;

a first switching transistor connected to the first resistor;

a controller connected to the first switching transistor  
15 for outputting a control signal for blocking a froth when the froth is sensed;

a second resistor connected to the controller;

a second switching transistor connected to the second resistor;

20 a heater coil connected to the second switching transistor; and

a third switching transistor connected to the second switching transistor.

25 2. The device as claimed in claim 1, wherein the ground

electrode and the signal electrode are electrically connected to a heater and a temperature sensor, respectively.