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(54) **STEAM IRONING PRESS**

DAMPFBÜGELPRESSE

PRESSE-REPASSEUSE A VAPEUR

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(56) References cited:
FR-A- 2 477 592
FR-A- 2 509 764
US-A- 4 955 152

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Description

BACKGROUND OF THE INVENTION

Known portable steam ironing presses, as disclosed for example in U.S. Patent 4955152, employ a fixed lower member and an upper member manually movable upward to a position spaced above the lower member and downward into engagement with the lower member. An article to be pressed is disposed between the members when separated and is squeezed therebetween when the members engage. The article is pressed using heat and steam supplied with appropriate timing via the upper member.

Such known presses use pumps to inject water under pressure into electrically heated regions wherein the water is converted into steam. The pump is mechanically actuated.

The present invention is directed toward a new type of steam ironing press wherein the pump is actuated by a direct current motor, and all functions other than the movement of the upper and lower members and setting of manually adjustable controls are programmed and controlled electronically.

SUMMARY OF THE INVENTION

In accordance with the principles of the invention, a steam press adapted to press an article of fabric utilizes a lower stationary horizontal member and an upper movable horizontal member, the press having an open position at which the upper member is spaced above the lower member and having a closed position at which the upper member engages the lower member. Fabric to be pressed is disposed between the two members.

The upper member has first means including a water inlet port, and at least one electrically energizable element adapted to heat the surface of said upper member adjacent the lower member and when water is delivered to the inlet port to heat said water into steam,and bottom disposed steam outlet ports for discharging the steam into the fabric being pressed.

The press contains a water reservoir and a pump for pumping water out of the reservoir into the water inlet of the upper member. The pump has a pump body having an inlet into which water is drawn by suction from the reservoir and an outlet through which water is expelled under pressure into the water inlet. The pump also has a piston movable therein.

The pump is powered by a direct current motor having a drive shaft which rotates in one direction when a direct voltage of selected polarity is applied to the motor and which rotates in opposite direction when the polarity of the applied voltage is reversed. The piston is coupled to the shaft and moves back and forth in the body in accordance with the direction of rotation of the drive shaft to develope the suction or expelling force.

Second means is coupled to the pump and to the first means. The second means controls the timing and application of the direct voltages of different polarities to the pump moter and regulates the flow of current through the electrical heating element whereby steam is produced as required.

The foregoing and other functions of the press, other than the movement of the upper and lower members and setting of manually adjustable controls, are programmed and controlled electronically. As a result, a press in accordance with the invention exhibits a substantial increase both in ease of operation and in accuracy and efficiency of pressing as compared to known portable steam iron presses.

Additional features and advantages of this invention will either be explained or will become apparent hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig 1 is a detail front view of externally disposed switches, steam volume control and LEDs employed in a preferred embodiment of the invention.

Fig 2 is a front perspective view of the embodiment of Fig 1.

Fig 3 is an exploded view of the movable upper member shown in Fig 2

Figs 4, 5, 6 and7 are different views of the pump and water-reservoir used in the embodiment of Fig 1.

Figs 8 and 9 are block diagrams of the electrical control system used in the embodiment of Fig 1.

Fig 10 is a circuit diagram of the system shown in block diagramatic form in Figs 8 and 9.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring first to Fig 1, the press employs the following elements; a steam volume lever 100 which is manually moved to set the steam volume from zero volume to full volume; a water reservoir or tank fill cap 102; a water level window 104 which displays the water level in the tank; a power on-off button 106; a sound on-off button 108 which when depressed cuts off sound and when depressed again turns the sound on; a sound indicator LED 110 which lights up when the sound is on; a steam on-off button 112 which when turned off prevents formation of steam and when turned on makes steam available when the temperature is high enough; a steam on-off indicator LED 114 which lights up when the steam on-off button is turned on to indicate that steam is available when the temperature is high enough and when dark indicates that steam is not available; a burst of steam button 116 which can be pressed for an additional injection of steam when the iron temperature is equal to that of LINEN or higher; a temperature select button matrix 118 which can be used to select any one of six different temperatures for materials indicated [70 C for nylon, 105C for silk, 130C for wool, 155C for cotton,

180C for linen and 200C maximum]; each button having a temperature select-indicator LED which lights up to identify the selected temperature and flashes when the temperature is rising to that selected; an automatic shut off indicator LED 120 which lights up when the heater and the pump motor are automatically shut off; a low water level indicator LED 120 which lights up when the level of water in the reservoir is too low; a temperature ready indicator LED 122 which lights up when the selected temperature is reached and flashes when the press is heating or cooling to reach the selected temperature; and a steam ready indicator LED 124 which lights up when the press is ready for steam ironing.

Referring now to Figs 2 and 3, the press employs a stationary lower member 50 having an exposed upper surface 51 and a movable upper member 52 containing an ironing plate or platen 60 having an exposed lower surface. Plate 60 contains holes 62 through which steam can flow. A handle 54 secured to member 52 can be used to manually move the member 52 toward and away from member 50. The handle and members are so balanced that the handle can be used to move the member 52 to any position between maximum separation and minimum separation [engagement] with respect to member 50.

A labyrinth plate 72 is disposed between platen 60 and an uper cover plate 74. Place 72 contains pathways or cut out channels which terminate in outlet holes 70. Holes 70 are aligned with holes 62 in the platen. The formed labyrinth has a thickness on the order of one millimeter. The longitudinal edges of plate 72 are inwardly offset from the platen. The platen carries one or more electrically energized elongated heating rods 58 which are held in place by a plurality of damps 61. Curved members 75 integral with the cover plate 7-4 are positioned over the clamps so that heat emitted from the upper portions as well as the lower portions of rods 58 is directed downward upon the plate 72 and platen 60. If desired, another rod can be disposed along the opposite longitudinal edge of plate 72 and be supported by additional elements 75 in the same manner.

When water is pumped downwardly through pipes 56 and fittings 57 into the central cruciform region 59 of channels 68, water droplets in the channels are forced by their affinity to the heated surfaces to advance through the labyrinth gaining heat and deteriorating in size and are converted to steam prior to emission via holes 70. Consequently steam is discharged through the platen openings. The force of discharge of steam is generated by the thermodynamic pressure of the process.

Referring now to Figs 3-10, water to be converted into steam is stored in reservoir or tank 1 and a pump is used draw water out of tank 1 via inlet hose 17 and to pump water via outlet hose 18 and discharge tee 92 into pipes 56.

The pump is a syringe 9 with a movable piston 16. A direct current motor 2 is reversible and can be made to rotate either clockwise or counterclockwise by reversing the polarity of the voltage applied to the motor.

A pinion gear 3 is secured to the motor shaft and rotates therewith. The pinion gear engages a rack gear 4. One end of the rack gear is secured to piston 16 in a syringe.

The rack gear has a rod 8 secured thereo, the rod extending outwardly at right angles to the rack gear. The rod has a tip. Initially, the rack is in its rearmost position, the piston is in fully withdrawn position, the syringe contains a full charge of water and the motor has stopped. The tip of the rod is in its rearmost position and engages a microswitch 6 When this switch is closed, the motor is inoperative.

The motor is initially inoperative and the piston is fully withdrawn. The syringe is filled with water. When the press is in use and the upper member is moved downward to a position of about 15 degrees above the horizontal, the upper member closes another microswitch 202. This action sends a signal to the microprocessor 200 which in turn sends a signal and actuating a selected one of relays K2 and K3. A direct voltage of suitable polarity and value, typically about thirty two volts, is supplied from the output of regulator filter 204 through the dosed contacts of the actuated relay to the motor which then rotates clockwise.

As the motor rotates dockwise, the pinion gear advances the rack, the rod is moved forward and the tip is moved out of engagement with the microswitch 6 which opens. As the motor continues to rotate, the forward movement of the rack advances the piston in the syringe and forces water out of the syringe via the outlet hose into the steam generation section of the upper member. Once the preselected amount of water is forced out the tip of the rod which has also been advanced engages a second microswitch 10. This action sends a signal to the microprocessor which then sends a signal to the relays, deactuating the previously selected relay and actuating the previously unselected relay. The same direct voltage with the same polarity passes through the dosed contacts of the now actuated relay, but due to the reversal of connections between the conatacts and the relay, the voltage is applied to the motor with reverse polarity. The motor first stops and then begins to rotate counterclockwise.

This reversal of motor rotation reverses the action and the motor, rack, piston and rod return to their original positions. During this reversal, a suction action draws water from the reservoir, through the inlet hose and into the syringe. Finally, the tip of the rod engages the first microswitch 6, sending a signal to the microprocessor which then sends a signal deactuating both relays and the motor is caused to stop.

If an additional burst of steam is required at this point, depression of the burst of steam button 116 will send the same signal to the microprocessor that is produced by closure of microswitch 202 and the cycle for producing steam will be repeated.

When the steam cut off button is depressed, a signal is sent to the microprocessor which then sends a signal deactuating both relays K2 and K3, thus preventing the pump from operating. The bar will continue to produce heat even when steam is not required.

The amount or volume of water injected into the syringe can be varied by adjusting the position of microswitch 6 to lengthen or shorten the distance the piston travels and thus increase or decrease the water volume. This action is carried out using lever 13 connected to the manually adjustable prong 11. When the prong is moved along the slot on the cover 12, microswitch bracket 10 and microswitch 6 will follow the movement. The movement is limited by the length of the slot 14. The steam volume lever 100 is connected to the prong, thus enabling a press operator to make the desired adjustment

When the power on-off button 106 is depressed, switch 206 is closed, the power on-off relay K1 is closed and the conventional mains voltage of one hundred and fifteen volts is applied across the primary winding of step down transformer 208. The voltage across the secondary winding is rectified and filtered as shown at regulator filter 204 [which comprises a rectifier filter]. The output of regulator filter 204 is connected to a voltage regulator 210, which produces a regulated direct voltage of lower value typically about five volts. This regulated direct voltage is supplied to the microprocessor 200.

The alternating voltage applied to the primary of transformer 208 is also supplied to the heater bar or bars 58. The temperature selection matrix 118 is connected as an input to the microprocessor 200 and the microprocessor has an output connected via a control driver or isolating amplifier 212 to an optical triac 214. The triac regulates the portion of the alternating current cyde during which current flows through the bar 58 to regulate the heat produced in the press in accordance with the selected temperature. As the temperature selected increases, the portion of the cyde increases and as the temperature selected decreases, portion of the cyde decreases accordingly. A thermistor 216 senses the actual temperature and sends an appropriate signal to the microprocessor which then sends an appropriate control signal via amplifier 212 to the triac. The resistance of this sensor decreases with increasing temperature.

When the temperature reaches the desired value, or exceeds it, signal supplied to the triac will cause the triac to cut off current flow through the bar.

The press incorporates an automatic safety shut off functions. When the handle of the press is in the down position so that the press is closed, if the press remains dosed longer than thirty seconds, the current flow through the heater is cut off, thus preventing excessive temperature build up. At the same time, the voltage applied to the motor is removed, stopping motor rotation. When the handle of the press is in the up position so that the press is open, if the press remains open for longer than fifteen minutes, the same events will ensue. The current flow through the heater will be cut off and motor rotation will stop. In either situation, the closed press must be opened or the opened press must be closed after shut off in order to restart normal operation.

Mercury switch 218 is used to initiate and control the timing of the automatic safety shut off functions. This switch is dosed when the press is opened and is open when the press is dosed. This switch signals its open or closed position as an input signal to the microprocessor. There are two timing circuits, a thirty second timing circuit defined by normally conductive transistor Q1 and associated diode, capacitor and resistor passive components, and a fifteen minute timing circuit defined by normally conductive transistor Q2, timer integrated circuit U3 and associated passive components. The microprocessor responds to the input signal to send a signal to the appropriate timing circuit and actuate it. If the operation of the press is maintained within the appropriate limits, the mercury switch will change from open to closed or closed to open, causing the microprocessor to deactuate the timer before its limits are reached. However, if the operation of the press exceeds the limits defined by the actuated circuit, the appropriate one of transistors Q1 and Q2 will be rendered nonconductive, deactuating relay K1 and disabling the motor and heater bar.

A water sensor switch 220 is disposed in the water tank. This switch is normally open. When the water lever falls below the desired minimum level, this sensor switch closes, sending a signal to the microprocessor which then sends a signal to LED 120 which lights to alert the user that the water level is too low.

The sound button controls switch 220 which is connected in circuit with a buzzer 222. When switch 220 is open, no sound will be produced. When switch 220 is closed, the buzzer will sound when an appropriate signal is supplied from the microprocessor. The microprocessor can send such signal for example,when the water level is too low or when the power is turned on. Once the buzzer sounds, switch 220 must be opened before the buzzer will be turned off.

While the invention has been described with particular reference to the preferred embodiment and the drawings, the protection sought is to be limited only by the terms of the claims which follow.

Claims

1. A steam press for pressing fabric wherein a movable upper member (52) is disposed above a stationary lower member (50), the press having respective open and closed positions at which the movable upper member (52) is respectively spaced from or engages the lower member (50), fabric being pressed when disposed between the two engaged members, said press comprising;

a structure disposed in the upper member (52) and including a water inlet port (56), an electrically energizable element (58) adjacent said water port and adapted to heat the surface of said upper member adjacent the lower member when the upper and lower members are engaged and, when water is delivered to the inlet port, to heat said water into steam, and steam outlet ports (62,70) therein for discharging steam into the fabric being pressed;
a water reservoir (1) having a water outlet port (17);
a pump having a pump body (9) with an inlet (17) connected to the reservoir outlet and an outlet (18) connected to the water inlet port in said structure and provided with a piston (16) slidable back and forth in the body (9);

characterised in that said press further comprises;

a direct current motor (2) having a drive shaft coupled to said piston (16), said shaft rotating in a first direction when a direct voltage of a first polarity is applied to the motor (2) to cause the piston (16) to slide longitudinally in the pump body (9) in a direction to draw water out of the reservoir (1) into the pump body (9), said shaft rotating in a second and reversed direction when a direct voltage of a second and reversed polarity is applied to said motor (2) to cause the piston (16) to slide longitudinally in the pump body (9) in reversed direction to force water out of the pump body (9) into the inlet port (56);
a source of said direct voltage, said source having a selected one of said first and second mutually opposed polarities; and
a device coupled between said source and said motor (2) and adapted to apply the direct voltage with either polarity to said motor (2), said device applying said direct voltage to said motor (2) with said first polarity to cause water to be drawn out of the reservoir (1) into the pump body (9) and applying said direct voltage with said second polarity to force water out of the pump body (9) into the inlet water port (56).

2. The press of claim 1 further including a source of alternating current of fixed frequency and amplitude and means to supply said alternating current to said element (58) to electrically energize said element (58).

3. The press of claim 2 wherein said means to supply said alternating current to said element (58) includes additional means to control the amount of heat produced by said element by controlling the percentage of time during each alternating current cycle in which current flows in the element (58).

4. The press of claim 3 wherein the additional means includes a triac (214).

5. The press of claim 3 or claim 4 wherein additional means includes a plurality of manually operable push buttons (118), each button being associated with a different controlled percentage of time.

6. The press of any one of claims 2 to 5 further including a device for preventing said current from being supplied to said element (58) when the temperature of the press exceeds a preselected value.

7. A steam press according to any one of claims 1 to 6 further comprising first and second timing circuits which are normally deactuated, the first circuit being actuated when the press is closed and the second circuit being actuated when the press is open; and
an alarm device for preventing the heating element (58) from being supplied with electrical energy when either one of the circuits is actuated for a preselected time period.

8. The press of claim 7 wherein the preselected period of actuation of the first circuit is much smaller than the preselected period of actuation of the second circuit.

9. The press of any one of claims 1 to 6 further including means (Q1,Q2), actuated after a preselected interval of time, for preventing the application of direct voltage to said motor (2) and for preventing the supply of alternating current to said element (58).

10. A steam press according to any preceding claim wherein the shaft rotation is stopped when no direct voltage is applied to the motor (2); and
first and second relays (K2,K3) are coupled between said source and said motor (2), the first relay when actuated while the second relay is deactuated applying said direct voltage with said first polarity to said motor (2) to cause water to be drawn out of the reservoir (1) into the pump body (9), said second relay when actuated while the first relay is deactuated applying said direct voltage with said second polarity to said motor (2) to force water out of the pump body (9) into the inlet water port (56), no direct voltage being applied to the motor when both relays (K2,K3) are deactuated.

11. The press of claim 10 including a microprocessor (200) coupled to said relays (K2,K3) and adapted to send a selected one of first, second and third output signals thereto, the first output signal actuating the first relay and deactuating the second relay, the second output signal actuating the second relay

and deactuating the first relay, the third output signal causing both relays (K2,K3) to be deactuated.

12. The press of claim 11 wherein the piston (16) has a first position when the pump body (9) is full of water and a second position when the pump body (9) has been emptied of water, the press further including piston sensing means (6,10) which sends a first microprocessor input signal to the microprocessor (200) when the piston (16) is in the first position and a second microprocessor input signal to the microprocessor (200) when the piston (16) is in the second position, the microprocessor (200) responding to the first input signal to produce the third output signal and responding to the second input signal to produce the first output signal.

13. The press of claim 12 wherein said piston sensing means includes a plurality of electromechanical switches (6,10), each switch having open and closed positions.

14. The press of claim 12 or claim 13 further including starting means to send a third microprocessor input signal to the microprocessor (200) when both relays have been deactuated, the microprocessor responding to the third input signal to produce the second output signal.

15. The press of claim 14 wherein the starting means includes an electromechanical switch.

Patentansprüche

1. Dampfpresse zum Bügeln bzw. Pressen von Textilien bzw. Stoff, worin ein beweglicher Oberteil (52) über einem stationären Unterteil (50) angeordnet ist, wobei die Presse über eine offene bzw. eine geschlossene Position verfügt, in der der bewegliche Oberteil (52) vom Unterteil (50) beabstandet bzw. mit diesem in Eingriff ist, wobei Stoff gebügelt wird, wenn er sich zwischen den beiden im Eingriff befindlichen Elementen befindet, wobei die Presse umfaßt:

eine Struktur, die im Oberteil (52) angeordnet ist und die eine Wassereinlaßöffnung (56), ein mit elektrischer Energie versorgbares Element (58), das an die Wasseröffnung angrenzt und so ausgebildet ist, daß es jene Oberfläche des Oberteils erwärmt, die an den Unterteil angrenzt, wenn sich der Ober- und der Unterteil in Eingriff befinden, und daß es, wenn Wasser an die Einlaßöffnung abgegeben wird, dieses Wasser zu Dampf erhitzt, sowie Dampfauslaßöffnungen (62,70) darin zum Abgeben von Dampf in den zu bügelnden Stoff umfaßt;

einen Wasserbehälter (1) mit einer Wasserauslaßöffnung (17);

eine Pumpe, die einen Pumpenkörper (9) mit einem an den Behälterauslaß angeschlossenen Einlaß (17) und einem an die Wassereinlaßöffnung in der Struktur angeschlossenen Auslaß (18) aufweist und mit einem Kolben (16) versehen ist, der im Körper (9) hin- und hergleiten kann;

dadurch gekennzeichnet, daß die Presse weiters umfaßt:

einen Gleichstrommotor (2), dessen Antriebswelle an den Kolben (16) gekoppelt ist, wobei sich die Welle in eine erste Richtung dreht, wenn eine Gleichspannung mit einer ersten Polarität an den Motor (2) angelegt wird, sodaß bewirkt wird, daß der Kolben (16) im Pumpenkörper (9) in Längsrichtung in eine solche Richtung gleitet, daß Wasser aus dem Behälter (1) in den Pumpenkörper (9) gezogen wird, wobei sich die Welle in eine zweite und umgekehrte Richtung dreht, wenn eine Gleichspannung mit einer zweiten und umgekehrten Polarität an den Motor (2) angelegt wird, sodaß bewirkt wird, daß der Kolben im Pumpenkörper (9) in Längsrichtung in die entgegengesetzte Richtung gleitet, sodaß Wasser aus dem Pumpenkörper (9) in die Einlaßöffnung (56) gedrängt wird;

eine Gleichspannungsquelle, wobei die Quelle eine ausgewählte aus der ersten und der zweiten einander entgegengesetzten Polaritäten aufweist; und

eine Vorrichtung, die zwischen die Quelle und den Motor (2) gekoppelt und so ausgebildet ist, daß die Gleichspannung mit einer bestimmten Polarität an den Motor (2) angelegt wird, wobei die Vorrichtung die Gleichspannung mit der ersten Polarität an den Motor (2) anlegt, sodaß bewirkt wird, das Wasser aus dem Behälter (1) in den Pumpenkörper (9) gezogen wird, und die Gleichspannung mit der zweiten Polarität anlegt, sodaß Wasser aus dem Pumpenkörper (9) in die Einlaßwasseröffnung (56) gedrängt wird.

2. Presse nach Anspruch 1, die weiters eine Wechselstromquelle mit fixer Frequenz und Amplitude und Mittel zum Zuführen des Wechselstroms zum Element (58) umfaßt, um das Element (58) mit elektrischer Energie zu versorgen.

3. Presse nach Anspruch 2, worin die Mittel zum Zuführen des Wechselstroms zum Element (58) ein zusätzliches Mittel umfassen, um die Wärmemenge, die vom Element erzeugt wird, zu steuern, indem der prozentuelle Zeitanteil während eines jeden Wechselstromzyklus geregelt wird, in dem im Element (58) Strom fließt.

4. Presse nach Anspruch 3, worin das zusätzliche Mittel einen Triac (214) umfaßt.

5. Presse nach Anspruch 3 oder 4, worin das zusätzliche Mittel eine Vielzahl manuell betätigbarer Druckknöpfe (118) umfaßt, wobei jeder Knopf einem anderen geregelten prozentuellen Zeitanteil zugeordnet ist.

6. Presse nach einem der Ansprüche 2 bis 5, die weiters eine Vorrichtung umfaßt, um zu verhindern, daß dem Element (58) Strom zugeführt wird, wenn die Temperatur der Presse einen vorgewählten Wert übersteigt.

7. Dampfpresse nach einem der Ansprüche 1 bis 6, die weiters eine erste und eine zweite Zeitgebungsschaltung umfaßt, die normalerweise deaktiviert sind, wobei die erste Schaltung aktiviert wird, wenn die Presse geschlossen ist, und die zweite Schaltung aktiviert wird, wenn die Presse offen ist, und eine Alarmvorrichtung, um zu verhindern, daß das Heizelement (58) mit elektrischer Energie versorgt wird, wenn eine der Schaltungen für einen vorgewählten Zeitraum aktiviert ist.

8. Presse nach Anspruch 7, worin der vorgewählte Aktivierungszeitraum der ersten Schaltung viel kürzer ist als der vorgewählte Aktivierungszeitraum der zweiten Schaltung.

9. Presse nach einem der Ansprüche 1 bis 6, die weiters nach einem vorgewählten Zeitintervall aktivierte Mittel (Q1, Q2) umfaßt, um das Anlegen der Gleichspannung an den Motor (2) zu verhindern und die Zufuhr von Wechselstom zum Element (58) zu verhindern.

10. Dampfpresse nach einem der vorangegangenen Ansprüche, worin die Rotation der Welle unterbrochen wird, wenn an den Motor (2) keine Gleichspannung angelegt wird; und
erste und zweite Relais (K2, K3) zwischen die Quelle und den Motor (2) gekoppelt sind, wobei das erste Relais, wenn es aktiviert ist, während das zweite Relais deaktiviert ist, die Gleichspannung mit der ersten Polarität an den Motor (2) anlegt, sodaß bewirkt wird, daß Wasser aus dem Behälter (1) in den Pumpenkörper (9) hinausgezogen wird, wobei das zweite Relais, wenn es aktiviert ist, während das erste Relais deaktiviert ist, die Gleichspannung mit der zweiten Polarität an den Motor (2) anlegt, sodaß Wasser aus dem Pumpenkörper (9) in die Wassereinlaßöffnung (56) gedrängt wird, wobei keine Gleichspannung an den Motor angelegt wird, wenn beide Relais (K2,K3) daktiviert sind.

11. Presse nach Anspruch 10, die einen Mikroprozessor (200) umfaßt, der an die Relais (K2,K3) gekoppelt und dazu ausgebildet ist, ein ausgewähltes aus ersten, zweiten und dritten Ausgangssignalen an diese zu senden, wobei das erste Ausgangssignal das erste Relais aktiviert und das zweite Relais deaktiviert, das zweite Ausgangssignal das zweite Relais aktiviert und das erste Relais deaktiviert und das dritte Ausgangssignal bewirkt, daß beide Relais (K2,K3) deaktiviert werden.

12. Presse nach Anspruch 11, worin der Kolben (16) eine erste Position aufweist, wenn der Pumpenkörper (9) voll Wasser ist, sowie eine zweite Position, wenn der Pumpenkörper (9) wasserentleert worden ist, wobei die Presse weiters ein Kolbenfühlmittel (6,10) umfaßt, das ein erstes Mikroprozessoreingangssignal an den Mikroprozessor (200) sendet, wenn sich der Kolben (16) in der ersten Position befindet, sowie ein zweites Mikroprozessoreingangssignal an den Mikroprozessor (200) sendet, wenn sich der Kolben (16) in der zweiten Position befindet, wobei der Mikroprozessor (200) auf das erste Eingangssignal so anspricht, daß das dritte Ausgangssignal erzeugt wird, und auf das zweite Eingangssignal so anspricht, daß das erste Ausgangssignal erzeugt wird.

13. Presse nach Anspruch 12, worin das Kolbenfühlmittel eine Vielzahl elektromechanischer Schalter (6,10) umfaßt, wobei jeder Schalter über eine offene und eine geschlossene Position verfügt.

14. Presse nach Anspruch 12 oder 13, die weiters Startmittel umfaßt, um ein drittes Mikroprozessoreingangssignal an den Mikroprozessor (200) zu schicken, wenn beide Relais deaktiviert worden sind, wobei der Mikroprozessor auf das dritte Eingangssignal so anspricht, daß das zweite Ausgangssignal erzeugt wird.

15. Presse nach Anspruch 14, worin das Startmittel einen elektromechanischen Schalter umfaßt.

Revendications

1. Presse à vapeur pour presser un tissu dans laquelle un élément supérieur mobile (52) est disposé audessus d'un élément inférieur fixe (50), la presse ayant des positions ouverte et fermée respectives

auxquelles l'élément supérieur mobile (52) est respectivement espacé de l'élément inférieur (50) ou s'engage avec celui-ci, le tissu étant pressé lorsque disposé entre les deux éléments engagés, ladite presse comprenant ;

une structure disposée dans l'élément supérieur (52) et comprenant un orifice d'entrée d'eau (56), un élément actionnable électriquement (58) adjacent audit orifice d'eau et adapté pour chauffer la surface dudit élément supérieur adjacent à l'élément inférieur lorsque les éléments supérieur et supérieur sont engagés et, lorsque de l'eau est fournie à l'orifice d'entrée, pour chauffer ladite eau en vapeur, et les orifices de sortie de vapeur (62, 70) dans celle-ci pour décharger des vapeurs dans le tissu en train d'être pressé ;
un réservoir d'eau (1) ayant un orifice de sortie d'eau (17) ;
une pompe ayant un corps de pompe (9) à une entrée (17) reliée à la sortie du réservoir et une sortie (18) reliée à l'orifice d'entrée d'eau dans ladite structure et pourvue d'un piston (16) pouvant coulisser en va et vient dans le corps (9) ;

caractérisée en ce que ladite presse comprend de plus :

un moteur à courant continu (2) ayant un arbre d'entraînement couplé audit piston (16), ledit arbre tournant dans une première direction lorsqu'une tension continue d'une première polarité est appliquée au moteur (2) pour amener le piston (16) à coulisser longitudinalement dans le corps de pompe (9) dans une direction pour soutirer de l'eau du réservoir (1) dans le corps de pompe (9), ledit arbre tournant dans une seconde direction inversée lorsqu'une tension continue d'une seconde polarité inversée est appliquée audit moteur (2) pour amener le piston (16) à coulisser longitudinalement dans le corps de pompe (9) en direction inversée pour forcer de l'eau hors du corps de pompe (9) dans l'orifice d'entrée (56) ;
une source de ladite tension continue, ladite source ayant une choisie desdites première et seconde polarités mutuellement opposées ; et
un dispositif couplé entre ladite source et ledit moteur (2) et adapté pour appliquer la tension continue de l'une ou l'autre des polarités audit moteur (2), ledit dispositif appliquant ladite tension continue audit moteur (2) avec ladite première polarité pour amener de l'eau à être extraite du réservoir (1) dans le corps de pompe (9) et appliquant ladite tension continue avec ladite seconde polarité pour forcer l'eau hors du corps de pompe (9) dans l'orifice d'entrée d'eau (56).

2. Presse de la revendication 1 comprenant de plus une source de courant alternatif de fréquence et d'amplitude fixes et un moyen pour appliquer ledit courant alternatif à l'élément (58) précité pour exciter électriquement ledit élément (58).

3. Presse de la revendication 2 dans laquelle le moyen précité pour appliquer le courant alternatif précité à l'élément (58) précité comprend un moyen additionnel pour contrôler la quantité de chaleur produite par ledit élément en contrôlant le pourcentage de temps pendant chaque cycle de courant alternatif dans lequel du courant circule dans l'élément (58).

4. Presse de la revendication 3 dans laquelle le moyen additionnel comprend un triac (214).

5. Presse de la revendication 3 ou de la revendication 4 dans laquelle le moyen additionnel comprend un certain nombre de boutons poussoir actionnables manuellement (118), chaque bouton étant associé à un pourcentage de temps contrôlé différent.

6. Presse de l'une quelconque des revendications 2 à 5 comprenant de plus un dispositif pour empêcher le courant précité d'être appliqué à l'élément précité (58) lorsque la température de la presse excède une valeur présélectionnée.

7. Presse à vapeur selon l'une quelconque des revendications 1 à 6 comprenant de plus des premier et second circuits de temporisation qui sont normalement désactivés, le premier circuit étant activé lorsque la presse est fermée et le second circuit étant activé lorsque la presse est ouverte ; et
un dispositif d'alarme pour empêcher l'élément de chauffage (58) d'être alimenté en énergie électrique lorsque l'un ou l'autre des circuits est actionné pendant une période de temps présélectionnée.

8. Presse de la revendication 7 dans laquelle la période présélectionnée d'actionnement du premier circuit est beaucoup plus petite que la période présélectionnée d'actionnement du second circuit.

9. Presse de l'une quelconque des revendications 1 à 6 comprenant de plus des moyens (Q1, Q2), activés après un intervalle de temps présélectionné, pour empêcher l'application de tension continue au moteur précité (2) et pour empêcher l'application du courant alternatif à l'élément précité (58).

10. Presse à vapeur selon l'une quelconque des revendications précédentes dans laquelle la rotation de l'arbre est arrêtée lorsqu'aucune tension continue

n'est appliquée au moteur (2) ; et

les premier et second relais (K2, K3) sont couplés entre la source précitée et le moteur précité (2), le premier relais lorsqu'activé alors que le second relais est désactivé appliquant la tension continue précitée à la première polarité précitée audit moteur (2) pour amener de l'eau à être extraite du réservoir (1) dans le corps de pompe (9), ledit second relais lorsqu'activé alors que le premier relais est désactivé appliquant ladite tension continue à la seconde polarité précitée audit moteur (2) pour extraire de l'eau de corps de pompe (9) dans l'orifice d'entrée d'eau (56), aucune tension continue n'étant appliquée au moteur lorsque les deux relais K2, K3) sont désactivés.

11. Presse de la revendication 10 comprenant un microprocesseur (200) couplé auxdits relais (K2, K3) et adapté pour transmettre à ceux-ci l'un sélectionné de premier, second et troisième signaux de sortie, le premier signal de sortie activant le premier relais et désactivant le second relais, le second signal de sortie activant le second relais et désactivant le premier relais, le troisième signal de sortie amenant les deux relais (K2, K3) à être désactivés.

12. Presse de la revendication 11 dans laquelle le piston (16) a une première position où le corps de pompe (9) est rempli d'eau et une seconde position lorsque le corps de pompe (9) a été vidé d'eau, la presse comprenant de plus un moyen de détection à piston (6, 10) qui transmet un premier signal d'entrée de microprocesseur au microprocesseur (200) lorsque le piston (16) est dans la première position et un second signal d'entrée de microprocesseur au microprocesseur (200) lorsque le piston (16) est dans la seconde position, le microprocesseur (200) répondant au premier signal d'entrée pour produire le troisième signal de sortie et répondant au second signal d'entrée pour produire le premier signal de sortie.

13. Presse de la revendication 12 dans laquelle le moyen de détection à piston précité comprend un certain nombre d'interrupteurs électromécaniques (6, 10), chaque interrupteur ayant des positions ouverte et fermée.

14. Presse de la revendication 12 ou de la revendication 13 comprenant de plus un moyen de démarrage pour transmettre un troisième signal d'entrée de microprocesseur au microprocesseur (200) lorsque les deux relais ont été désactivés, le microprocesseur répondant au troisième signal d'entrée pour produire le second signal de sortie.

15. Presse de la revendication 14 dans laquelle le moyen de démarrage comprend un interrupteur électromécanique.

FIG. 1

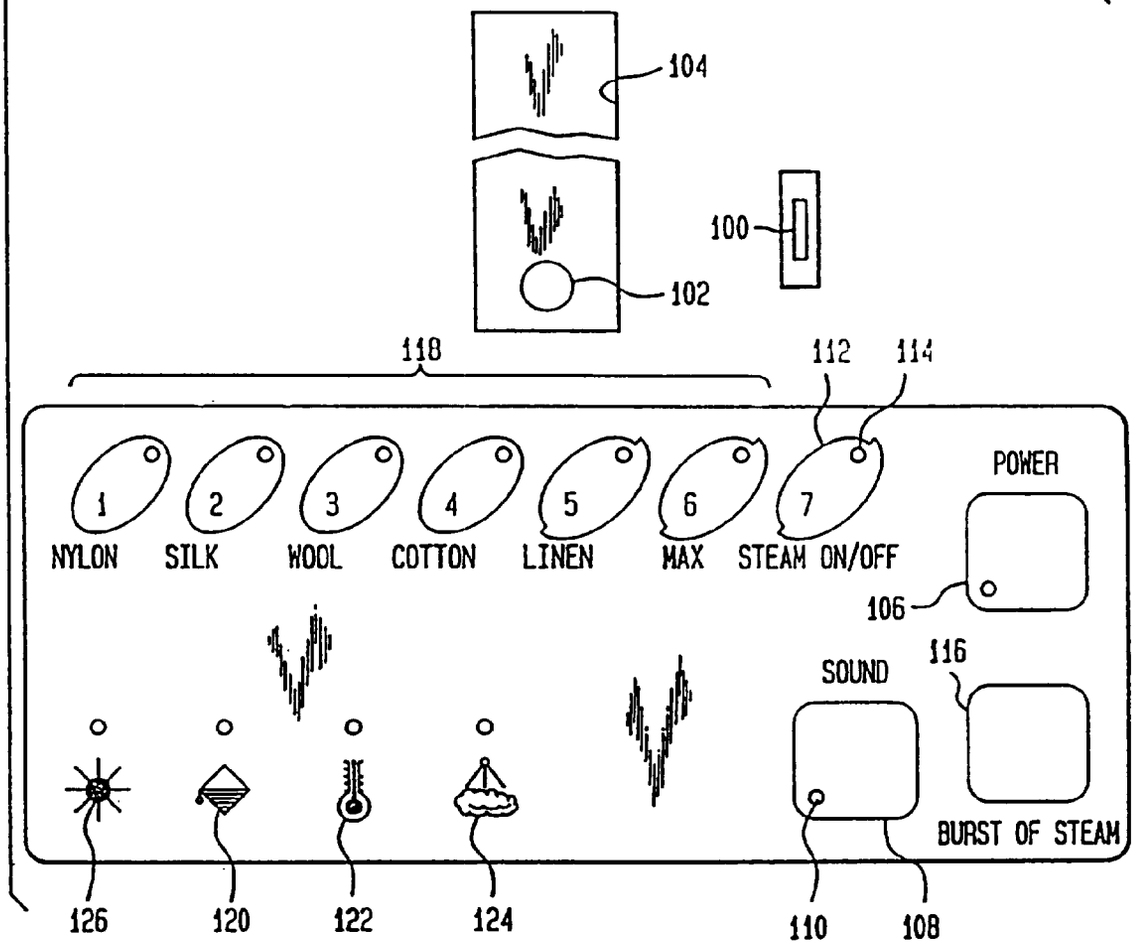

104
100
102
118
112
114
1
2
3
4
5
6
7
NYLON
SILK
WOOL
COTTON
LINEN
MAX
STEAM ON/OFF
POWER
106
SOUND
116
BURST OF STEAM
126
120
122
124
110
108

FIG. 2

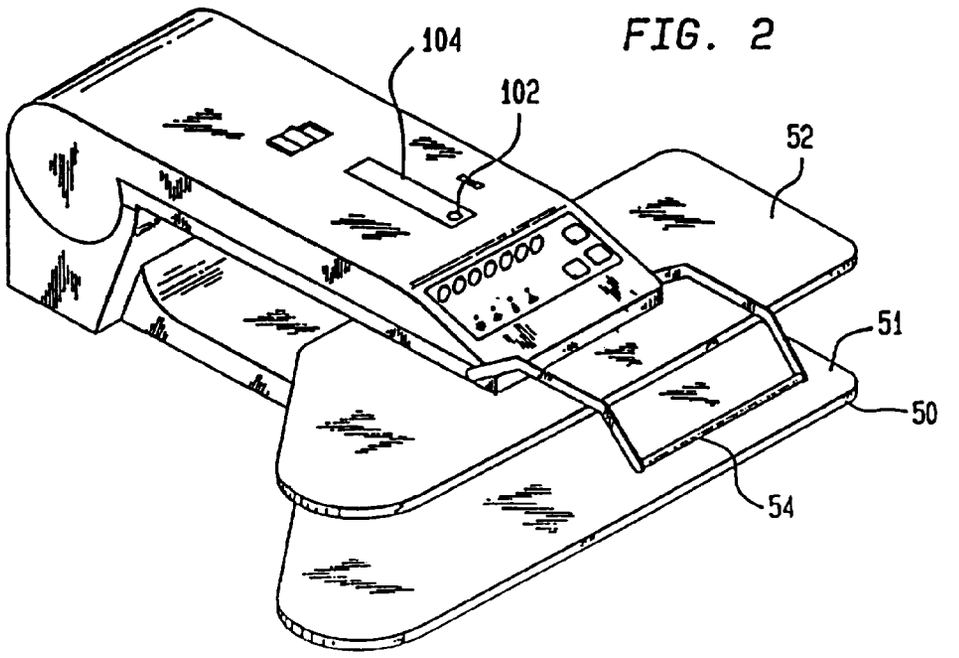
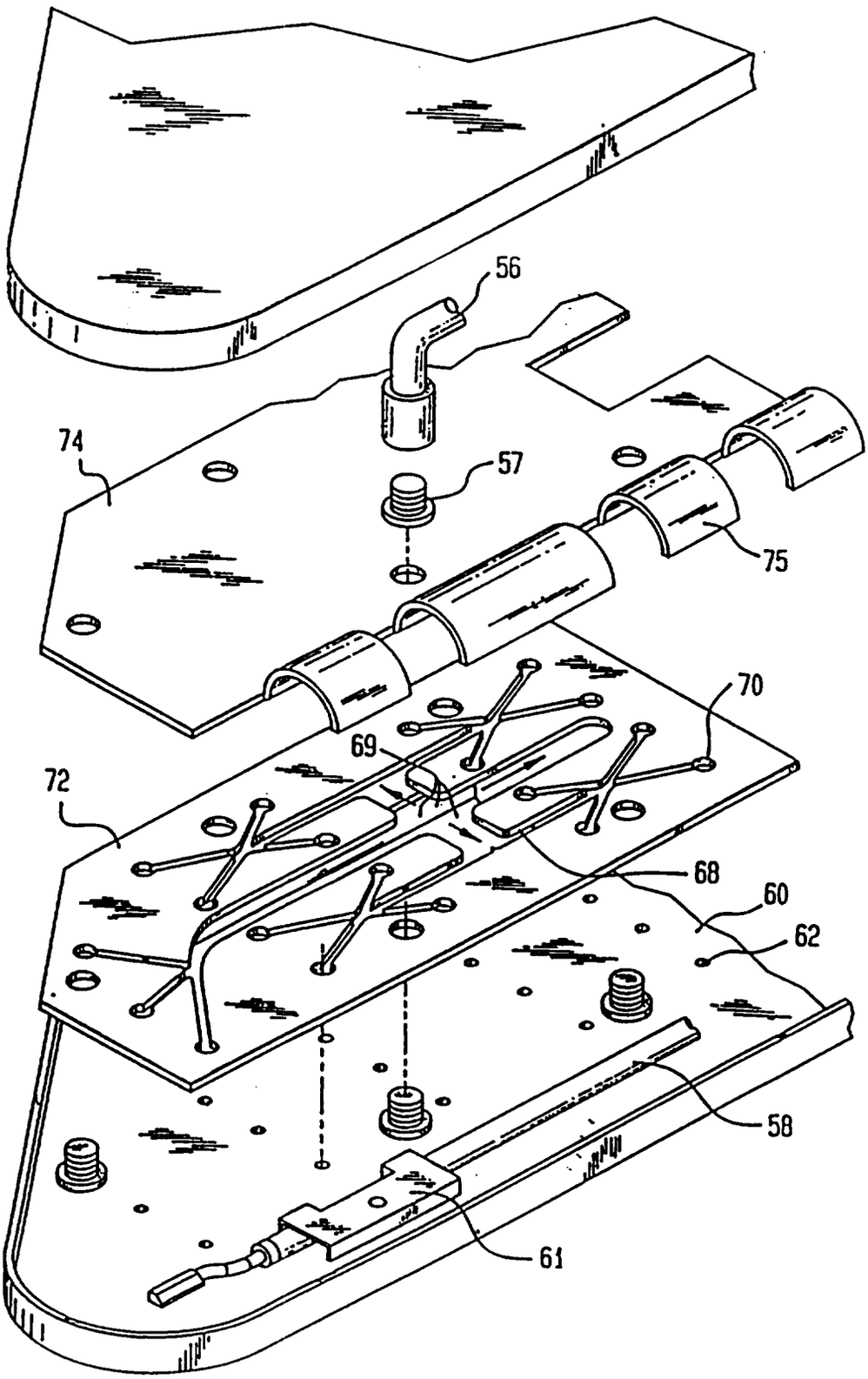

104
102
52
51
50
54

FIG. 3



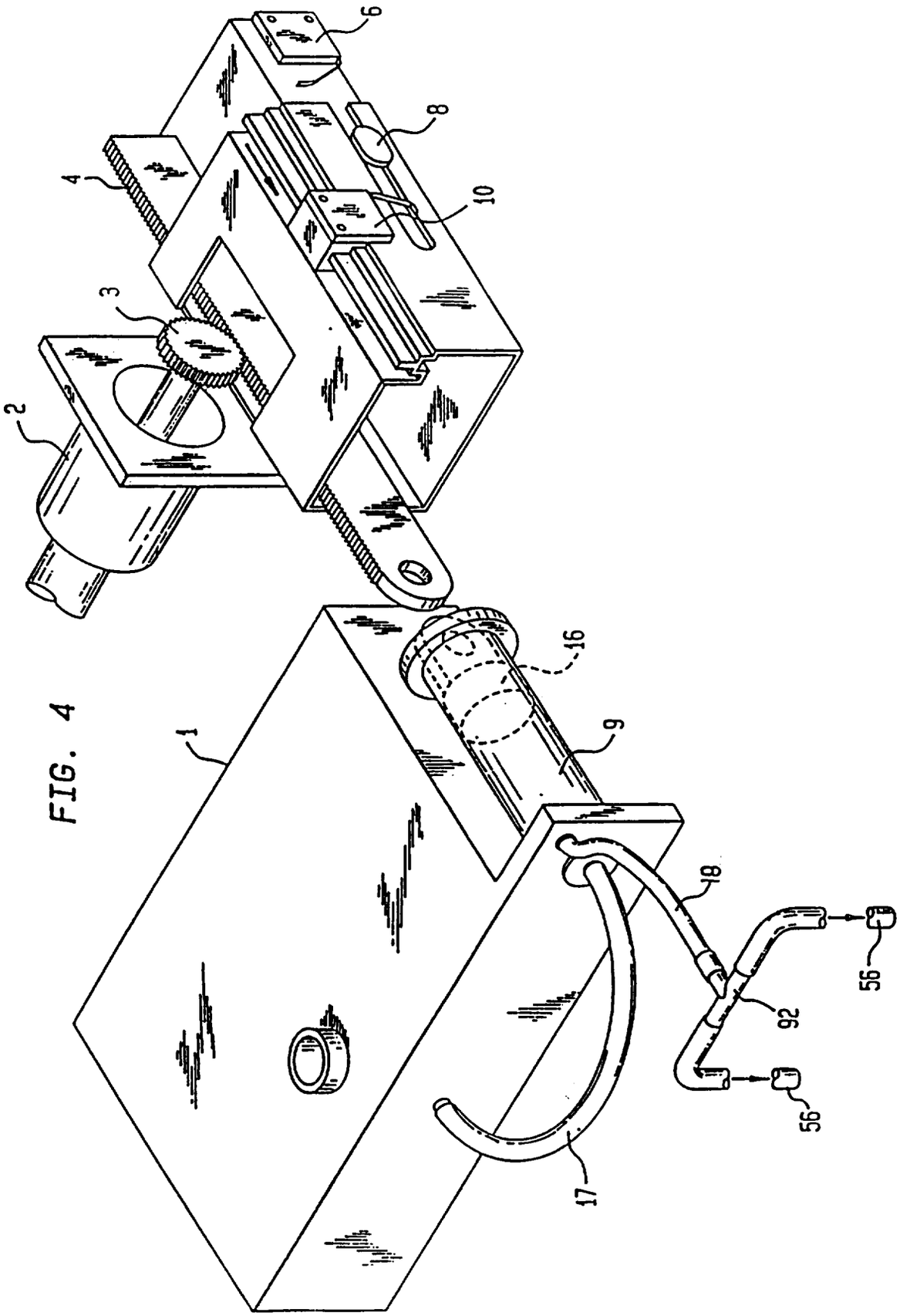


FIG. 4

FIG. 5

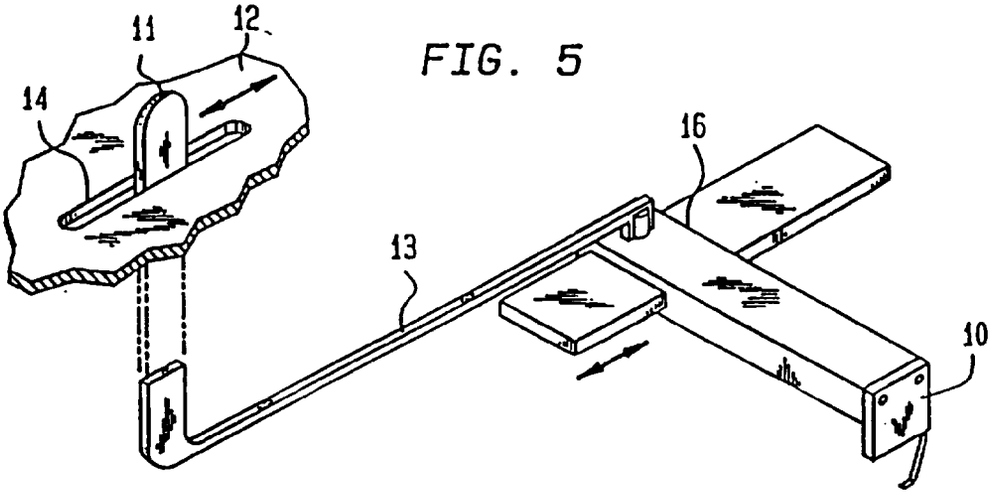


FIG. 6

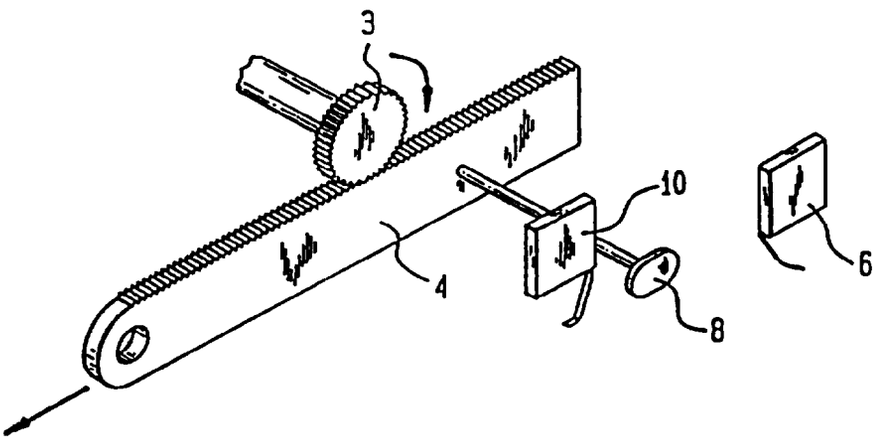


FIG. 7

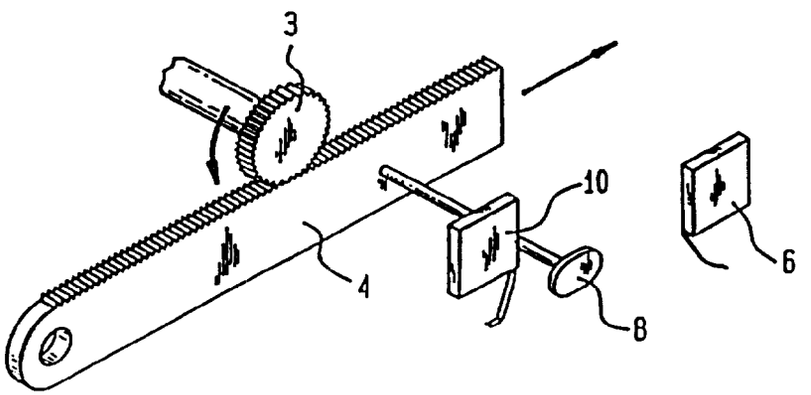


FIG. 8

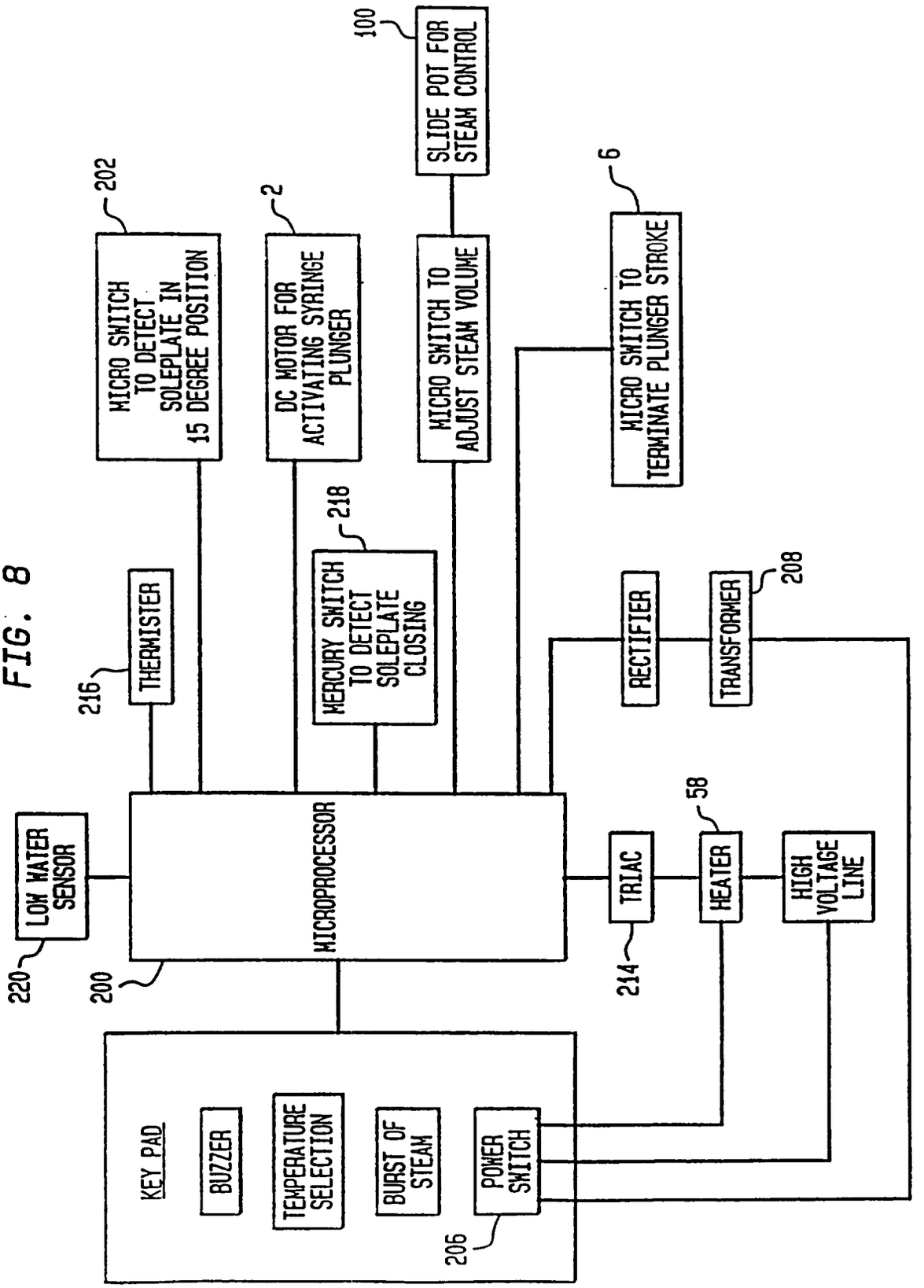

100
SLIDE POT FOR STEAM CONTROL
202
MICRO SWITCH TO DETECT SOLEPLATE IN 15 DEGREE POSITION
2
DC MOTOR FOR ACTIVATING SYRINGE PLUNGER
MICRO SWITCH TO ADJUST STEAM VOLUME
6
MICRO SWITCH TO TERMINATE PLUNGER STROKE
218
MERCURY SWITCH TO DETECT SOLEPLATE CLOSING
216
THERMISTER
RECTIFIER
TRANSFORMER
208
LOW WATER SENSOR
MICROPROCESSOR
TRIAC
58
HEATER
HIGH VOLTAGE LINE
220
200
214
KEY PAD
BUZZER
TEMPERATURE SELECTION
BURST OF STEAM
POWER SWITCH
206

FIG. 9

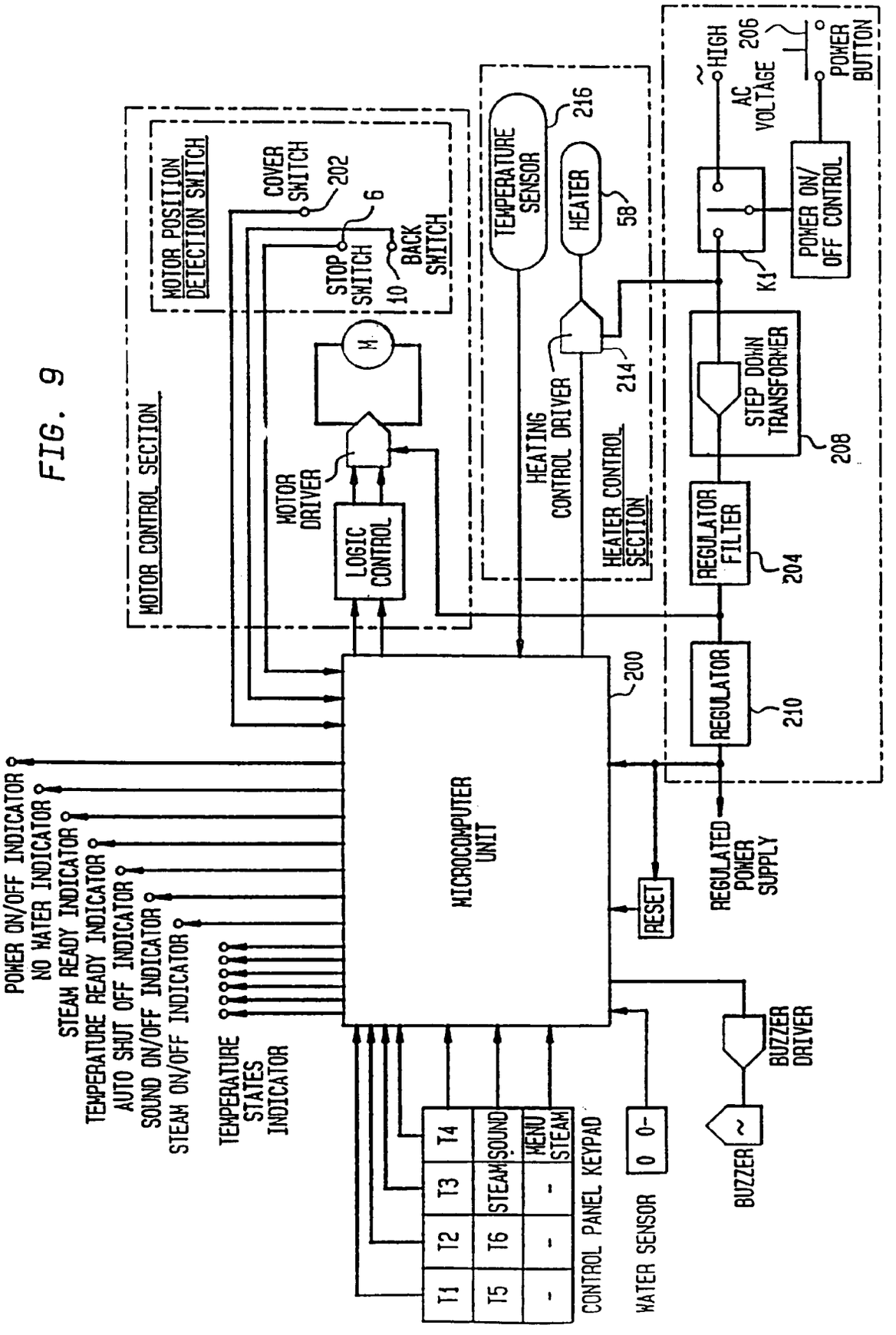
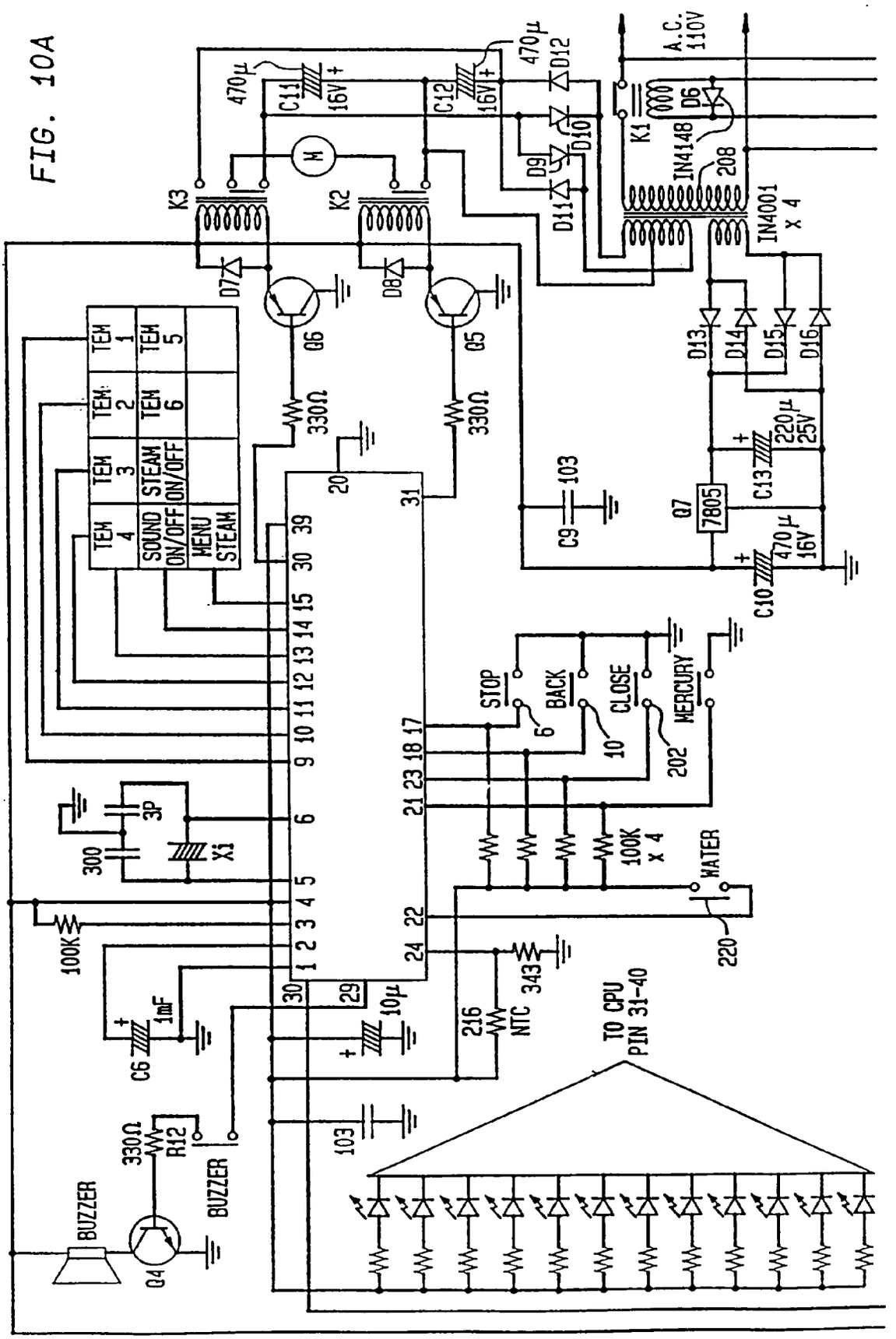

POWER ON/OFF INDICATOR
NO WATER INDICATOR
STEAM READY INDICATOR
TEMPERATURE READY INDICATOR
AUTO SHUT OFF INDICATOR
SOUND ON/OFF INDICATOR
STEAM ON/OFF INDICATOR
TEMPERATURE STATES INDICATOR
MICROCOMPUTER UNIT
200
RESET
REGULATED POWER SUPPLY
MOTOR CONTROL SECTION
MOTOR POSITION DETECTION SWITCH
COVER SWITCH
202
6
STOP SWITCH
10
BACK SWITCH
MOTOR DRIVER
LOGIC CONTROL
M
HEATING CONTROL DRIVER
TEMPERATURE SENSOR
216
HEATER
58
214
HEATER CONTROL SECTION
HIGH
AC VOLTAGE
206
POWER BUTTON
POWER ON/ OFF CONTROL
K1
STEP DOWN TRANSFORMER
208
REGULATOR FILTER
204
REGULATOR
210
T1
T2
T3
T4
T5
T6
STEAM
SOUND
MENU
STEAM
CONTROL PANEL KEYPAD
WATER SENSOR
0
0-
BUZZER
BUZZER DRIVER

FIG. 10A


A.C. 110V
K1
K2
K3
D6
IN4148
208
IN4001 x 4
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
C11 470µ 16V
C12 470µ 16V
C13 220µ 25V
C9 103
C10 470µ 16V
Q7 7805
Q6
Q5
330Ω
330Ω
TEM 1
TEM 2
TEM 3
TEM 4
TEM 5
TEM 6
STEAM ON/OFF
SOUND ON/OFF
MENU
STEAM
STOP
BACK
CLOSE
MERCURY
WATER
6
10
202
220
100K x 4
343
216 NTC
TO CPU PIN 31-40
X1
3P
300
100K
1mF
C6
10µ
103
330Ω
R12
BUZZER
BUZZER
Q4
20
31
39
30
29
24
22
21 23 18 17
15 14 13 12 11 10 9
6
5 4 3 2 1

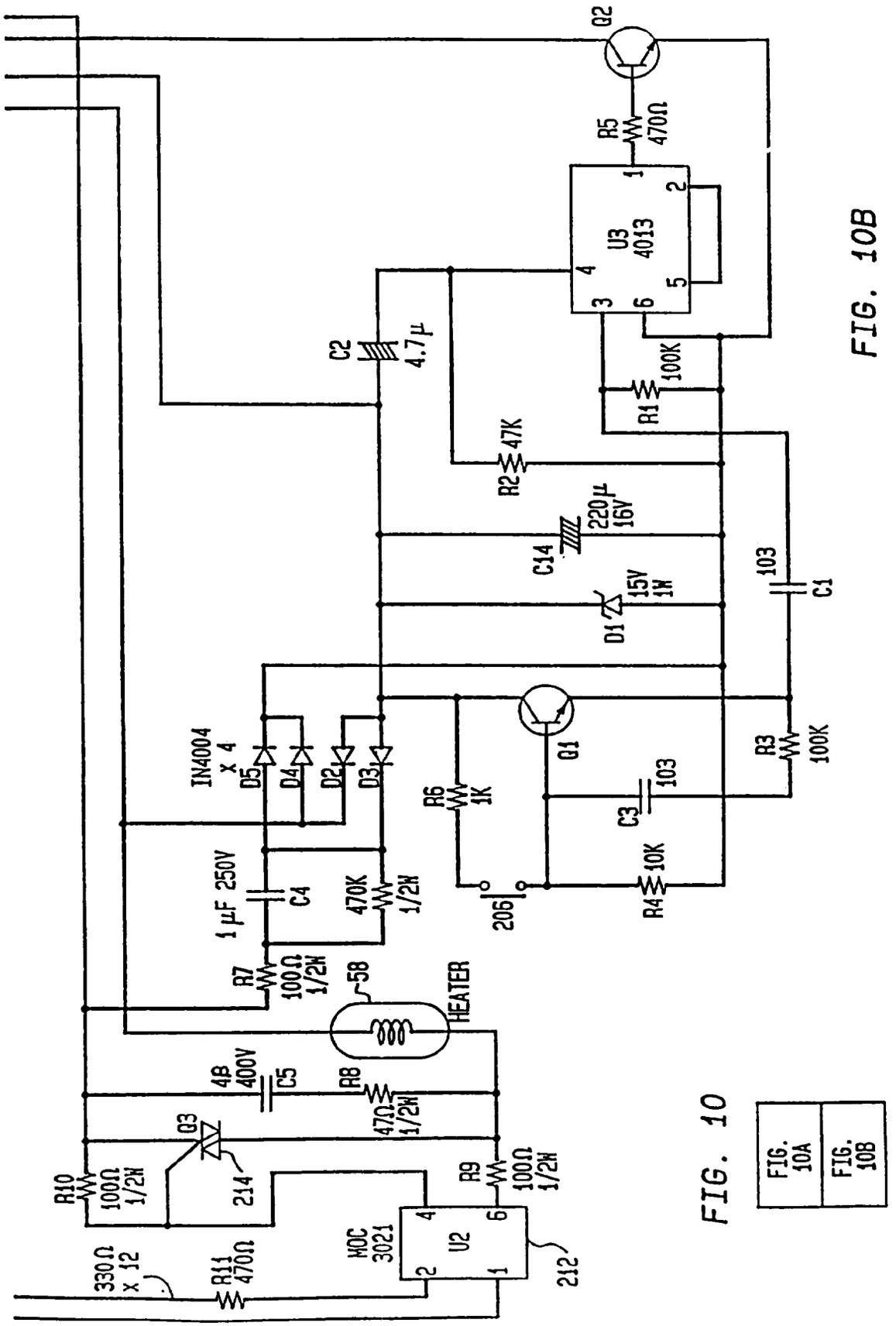


FIG. 10B

FIG. 10

FIG. 10A	FIG. 10B