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(54) **Title:** AN INNOVATIVE COOLING ROTISSERIE SPIT

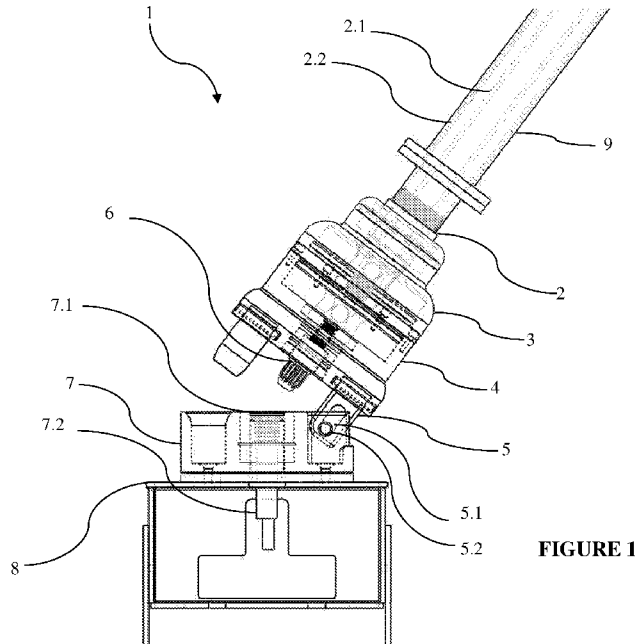


FIGURE 1

(57) **Abstract:** The present invention relates to an innovative cooling rotisserie spit (1) comprising at least one main tube (2) comprising an inner tube (2.1) including coolant passage holes thereon and an outer tube (2.2) including coolant passage holes thereon, at least one upper chamber (3) for passing the coolant that will be sent in between the outer tube (2.2) and the inner tube (2.1), at least one lower chamber (4) for preventing mixing of the coolant which has completed its circulation and is returning through the inner tube (2.1) with the coolant that will be supplied for circulation, at least one fixed supporting base (7) which is connected to the lower chamber (4), a joint group (5) which is used for coupling the lower chamber (4) and the main tube (2) that is connected to the lower chamber (4) to the supporting base (7) and enabling movement thereof, and which comprises at least one slot (5.1) having an angled geometry and at least one pin (5.2) moving within the slot (5.1), at least one centering shaft (6) for ensuring alignment (centering) during arrangement of the



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lower chamber (4) on the supporting base (7) and for the rotational movement of the main tube (2), at least one centering shaft housing (7.1) which corresponds to the centering shaft (6) and is used for aligning the lower chamber (4) and the supporting base (7), at least one tray (8) for placing the supporting base (7) thereon, at least one motor (8.1) which is located under the tray (8) and which generates the power required for the rotational movement of the main tube (2), at least one motor shaft (7.2) for transmitting the drive received from the motor (8.1) to the main tube (2) by means of the centering shaft (6), at least one cooling compressor (8.2) which is located under the tray (8) and is used for cooling the coolant, at least one coolant inlet hose (8.3) for transferring the coolant from the cooling compressor (8.2) to the upper chamber (3), at least one coolant outlet hose (8.4) for transferring the coolant which has completely the circulation cycle from the lower chamber (4) to the cooling compressor (8.2), an electronic or mechanical valve (V) for stopping the flow and restoring the flow after it is stopped.

AN INNOVATIVE COOLING ROTISSERIE SPIT

5 **Field of the Invention**

The present invention relates to a cooling rotisserie spit in which a coolant (air, gas, liquid, nano fluid, etc.) is circulated along the nested tubes in the form of a closed circuit and a cooling unit comprising a hollow casing spit which is affixed
10 to the said rotisserie spit for cooling thereof and on which the food items (doner kebab, etc.) are mounted.

Background of the Invention

15 The said rotisserie (doner kebab) spits generally work together with a heat emitting member (grill, etc.) to heat, cook and roast the food items, which are mounted on the spit from outside.

The doner spits are generally placed vertically on the grill machines, and the
20 pieces of meat are skewered on a vertically positioned spit body one by one to be stacked on top of each other. Upon completion of the stacking process, the rotisserie spit, which is connected to a heat emitting element such as a grill on the machine, begins to be rotated for cooking the food item thereon. The meat layer, which starts to be roasted on the outer surface, is cut (shaved off) with the help of
25 a knife from top to bottom. After the top layer is shaved off, the meat layer under it which is not yet cooked is heated and starts to be cooked.

Due to its rich nutritional content, meat is an ideal medium for growth and proliferation of microorganisms. Especially, storing meats that are marinated with
30 additives such as spices at inappropriate conditions, and keeping them wait for a long period of time while being exposed to the cooker during cooking cause the

temperature in the inner parts of the doner meat close to the main body of the spit to reach an ideal level for the microorganisms.

5 United States Patent document no US5918534, an application known in the state of the art, discloses a cooking spit with a hollow interior. A heat transfer medium is passed through the hollow part in the spit. In the present invention, by means of the heat transfer medium, heat is transferred to the food item (doner, meat, etc.) that is mounted on the spit to be roasted in order to reduce the cooking time of the food item. When the doner mounted on the spit is left to cool, the heat in the food
10 item is transferred outside by means of the heat transfer medium. However, when the said document is examined, the fact that the food item intended to be cooked is not mounted on the spit but onto the hooks positioned on the spit causes reduction of the amount of food item to be mounted. Another negative feature is that the spit disclosed in the document is not suitable for every rotisserie machine.
15 In addition, the cooling system continuously operates with the same performance; and since the amount of meat on the spit cannot be determined, the performance does not vary according to the amount of meat, which causes futile operation of the system.

20

The Problems Solved with the Invention

The objective of the present invention is to provide an innovative portable cooling system to prevent loss of the microbiological quality the doner meat. Cooling and
25 freezing is the most common method used for healthy storage of the meat products. With the rotisserie spit that is developed, the doner meat will be directly cooled, thus the efficiency of the invention will be higher compared to non-direct cooling systems.

30 Another objective of the present invention is to solve the problem that more than one doner kebab mounted on a spit having a cooling mechanism are required in enterprises such as restaurants where a large amount of doner kebab is consumed,

however this causes a problem of additional cost. In the present invention, the casing spits which are designed to be hollow and on which doner kebab is mounted are kept ready. When the doner kebab is finished, the empty casing spit affixed over the cooling spit on the machine is removed, and a casing spit on which doner kebab is mounted is affixed over the cooling spit. This way, use of cooling spits in restaurants with large amounts of doner kebab consumption is made convenient and low cost.

Detailed Description of the Invention

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An innovative cooling rotisserie spit developed to fulfill the objective of the present invention is illustrated in the accompanying figures wherein:

Figure 1. is a front view of the cooling rotisserie spit which is partially inclined in angular manner.

Figure 2. is a front view of the cooling rotisserie spit which is completely inclined at a right angle.

Figure 3. is a front view showing mounting of the casing spit over the main body.

20 **Figure 4.** is a schematic view of the circulation pat of the coolant.

Figure 5. is a schematic view of re-cooling of the coolant that exits circulation.

Figure 6. is a schematic view of the flow of the drive from the motor.

Figure 7. is a schematic view of the signal flow between the scale, control unit, valve and compressor.

25

The components shown in the figures are each given reference numbers as follows:

1. Innovative Cooling Rotisserie Spit

2. Main Tube

30 2.1. Inner Tube

2.2. Outer Tube

3. Lower Chamber

- 4. Upper Chamber
 - 5. Joint Group
 - 5.1. Slot
 - 5.2. Pin
 - 5 6. Centering Shaft
 - 7. Supporting base
 - 7.1. Centering Shaft Housing
 - 7.2. Motor Shaft
 - 8. Tray
 - 10 8.1. Motor
 - 8.2. Compressor
 - 8.3. Coolant Inlet Hose
 - 8.4. Coolant Outlet Hose
 - 9. Casing Spit
 - 15 K. Control unit
 - T. Scale
 - V. Valve
- 20 An innovative cooling rotisserie spit (1) essentially comprises
- at least one main tube (2) comprising an inner tube (2.1) including coolant passage holes thereon and an outer tube (2.1) including coolant passage holes thereon,
 - at least one upper chamber (3) for passing the coolant that will be sent in
 - 25 between the outer tube (2.2) and the inner tube (2.1),
 - at least one lower chamber (4) for preventing mixing of the coolant, which has completed its circulation and is returning through the inner tube (2.1), with the coolant that will be supplied for circulation,
 - at least one fixed supporting base (7) which is connected to the lower chamber
 - 30 (4),
 - a joint group (5) which is used for coupling the lower chamber (4) and the main tube (2) that is connected to the lower chamber (4) to the supporting base

- (7) and enabling movement thereof, and which comprises at least one slot (5.1) having an angled geometry and at least one pin (5.2) moving within the slot (5.1),
- at least one centering shaft (6) for ensuring alignment (centering) during arrangement of the lower chamber (4) on the supporting base (7) and for the rotational movement of the main tube (2),
 - at least one centering shaft housing (7.1) which corresponds to the centering shaft (6) and is used for aligning the lower chamber (4) and the supporting base (7),
 - at least one tray (8) for placing the supporting base (7) thereon,
 - at least one motor (8.1) which is located under the tray (8) and which generates the power required for the rotational movement of the main tube (2),
 - at least one motor shaft (7.2) for transmitting the drive received from the motor (8.1) to the main tube (2) by means of the centering shaft (6),
 - at least one cooling compressor (8.2) which is located under the tray (8) and which is used for cooling the coolant that will be supplied for circulation,
 - at least one coolant inlet hose (8.3) for transferring the coolant from the cooling compressor (8.2) to the upper chamber (3),
 - at least one coolant outlet hose (8.4) for transferring the coolant which has completely the circulation cycle from the lower chamber (4) to the cooling compressor (8.2).

A main tube (2) and a casing spit (9) affixed over the main tube (2), which are included by the innovative cooling rotisserie spit (1) of the present invention are disclosed. There are provided an inner tube (2.1) and an outer tube (3) within the main tube (2). There is provided an upper chamber (3) around the said outer tube (2.2), and the upper chamber (3) is connected to the cooling compressor (8.2) via a coolant inlet hose (8.2). Air, gas, liquid, nano fluid, etc. can be used as the coolant.

The coolant transferred from the cooling compressor (8.2) to the upper chamber (3) via the coolant inlet hose (8.3) enter in between the outer tube (2.2) and the inner tube (2.1) through the holes provided on the outer tube (2.2). The coolant rises between the outer tube (2.2) and the inner tube (2.1) until the uppermost point of the main tube (2). When the coolant reaches the uppermost point of the main tube (2), it enters into the inner tube (2.1) and moves downwards.

There is provided a lower chamber (4) surrounding the inner tube (2) and the coolant, which has completed its circulation cycle, is transmitted to the lower chamber (4) via the holes provided on the inner tube (2.1). The coolant in the lower chamber (4) is transmitted to the cooling compressor (8.2) which is connected to the lower chamber (4) via the coolant outlet hose (8.4). After being re-cooled there, it is fed back to circulation via the coolant inlet hose (8.3). Since the circulation cycle is designed as a closed circuit, there is no possibility of a leakage.

Thanks to its hollow design, the casing spit (9) can be fitted over the main tube (2) and heat transfer can be performed between them. This way, the central parts (inner core) of the food items (doner kebab, etc.) mounted on the casing spits (9) can be kept below a certain predetermined temperature.

The lower chamber (4) is connected to the supporting base (7) by means of a joint group (5) which comprises a slot (5.1) having an angled geometry and a pin (5.2) moving within the slot (5.1). By means of this connection, together with the lower chamber (4), the main tube (2) is also enabled to perform an angular inclination movement via the said joint group (5). When the doner kebab on the casing spit (9) is consumed, a new casing spit (9) on which doner kebab is mounted should be affixed to the main tube (2) for roasting, however the casing spit (9) on which doner kebab is mounted cannot be affixed to the main tube (2) that is in vertical position due to its weight. For this reason, the main tube (2) should be inclined in an angular manner via the joint group (5). This way, the empty casing spit (9) is

removed and the new casing spit (9) on which doner kebab is mounted is affixed onto the main tube (2) and the replacement is completed.

5 When the casing spit (9) on which doner kebab is mounted is affixed onto the main tube (2), the main tube (2) is again lifted in an angular manner. When a centering shaft (6), which is located at the lower chamber (4) and at the end part of the main tube (2) closer to the lower chamber (4), is fitted into a centering shaft housing (7.1) provided in the supporting base (7), the main tube (2) is aligned with the supporting base (7).

10

In the supporting base (7), there is provided a motor shaft (7.2), one end of which is connected to the centering shaft housing (7.1). Through the other end thereof, the said motor shaft (6) is connected to a motor (8.1) located under a tray provided at the bottom of the supporting base (7), and it starts to rotate by means of the power it receives from the motor (8.1), and transmits the rotational movement to the main tube (2) via the centering shaft (6). This way, the main tube (2) enables the casing spit (9) affixed thereto to rotate, and thus each and every surface of the doner kebab mounted on the casing spit (9) is enabled to be roasted evenly.

20 There is provided a scale (T) below the main tube (2) for determining the amount of the meat mounted on the casing spit (9). The information of the amount of meat determined by the scale (T) is transferred to a control unit (K) provided in the system. By altering the operation intervals of the compressor (8.2) in accordance with the signal transmitted from the control unit (K); the amount, temperature and pressure of the coolant to be delivered for circulation can be changed according to the amount of meat mounted on the spit (1).

30 An electronically or mechanically operated valve (V) is provided at the inlet or outlet point of the coolant or at both points. In accordance with the signal received by the valve (V) from the control unit (K), the flow is stopped or after being stopped, it is restored. Prior to removal of the main tube (2), the valve (V) is closed unilaterally and the coolant in the main tube (2) is vacuumed and drawn

into the compressor (8.2), and thus, the coolant is ensured to remain in the compressor (8.2) thereby saving the coolant. Additionally, when another unilateral closing is performed, when the main tube (2) is installed, the air therein is vacuumed, and presence of air in the coolant supplied to the main tube (2) is

5 completely prevented.

CLAIMS

1. An innovative cooling rotisserie spit (1) comprising
 - at least one main tube (2) comprising an inner tube (2.1) including coolant
5 passage holes thereon and an outer tube (2.1) including coolant passage holes thereon,
 - at least one upper chamber (3) for passing the coolant that will be sent in between the outer tube (2.2) and the inner tube (2.1),
 - at least one lower chamber (4) for preventing mixing of the coolant, which has
10 completed its circulation and is returning through the inner tube (2.1), with the coolant that will be supplied for circulation,
 - at least one fixed supporting base (7) which is connected to the lower chamber (4),
 - a joint group (5) which is used for coupling the lower chamber (4) and the
15 main tube (2) that is connected to the lower chamber (4) to the supporting base (7) and enabling movement thereof, and which comprises at least one slot (5.1) having an angled geometry and at least one pin (5.2) moving within the slot (5.1),
 - at least one centering shaft (6) for ensuring alignment (centering) during
20 arrangement of the lower chamber (4) on the supporting base (7) and for the rotational movement of the main tube (2),
 - at least one centering shaft housing (7.1) which corresponds to the centering shaft (6) and is used for aligning the lower chamber (4) and the supporting base (7),
 - 25 - at least one tray (8) for placing the supporting base (7) thereon,
 - at least one motor (8.1) which is located under the tray (8) and which generates the power required for the rotational movement of the main tube (2),
 - at least one motor shaft (7.2) for transmitting the drive received from the motor (8.1) to the main tube (2) by means of the centering shaft (6),
 - 30 - at least one cooling compressor (8.2) which is located under the tray (8) and which is used for cooling the coolant that will be supplied for circulation,

- at least one coolant inlet hose (8.3) for transferring the coolant from the cooling compressor (8.2) to the upper chamber (3),
 - at least one coolant outlet hose (8.4) for transferring the coolant which has completely the circulation cycle from the lower chamber (4) to the cooling compressor (8.2),
 - 5 - an electronic or mechanical valve (V) for stopping the flow and restoring the flow after it is stopped.
2. An innovative cooling rotisserie spit (1) according to Claim 1, **characterized**
- 10 **by** at least one casing spit (9) which is designed to be hollow so as to be affixed onto the main tube (2) and on which food items such as doner kebab etc. are mounted.
3. An innovative cooling rotisserie spit (1) according to Claim 1, **characterized**
- 15 **by** a scale (T) for determining the amount of meat mounted on the casing spit (9).
4. An innovative cooling rotisserie spit (1) according to Claim 1, **characterized**
- 20 **by** at least one control unit (K) for transmitting signal to the compressor (8.2) for determining the amount, temperature and pressure of the coolant that will be supplied in accordance with the amount of meat mounted on the casing spit (9).

FIGURE 1

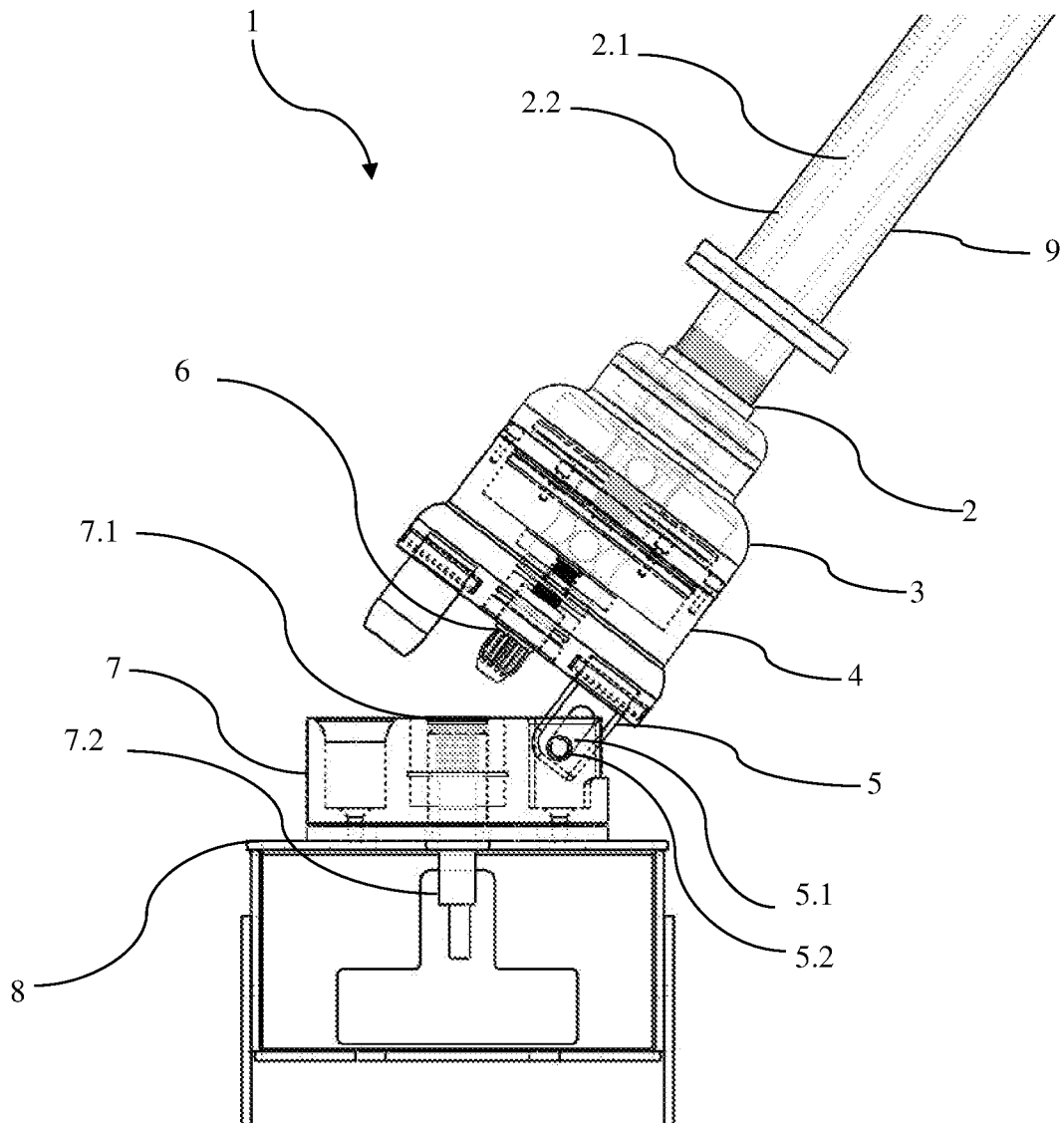


FIGURE 2

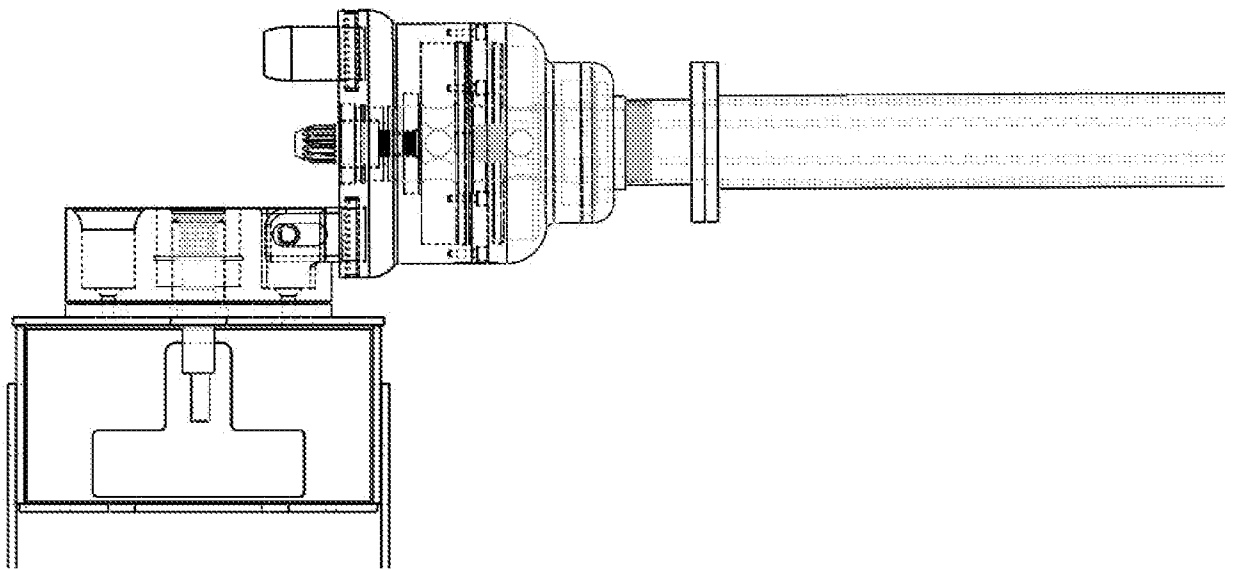


FIGURE 3

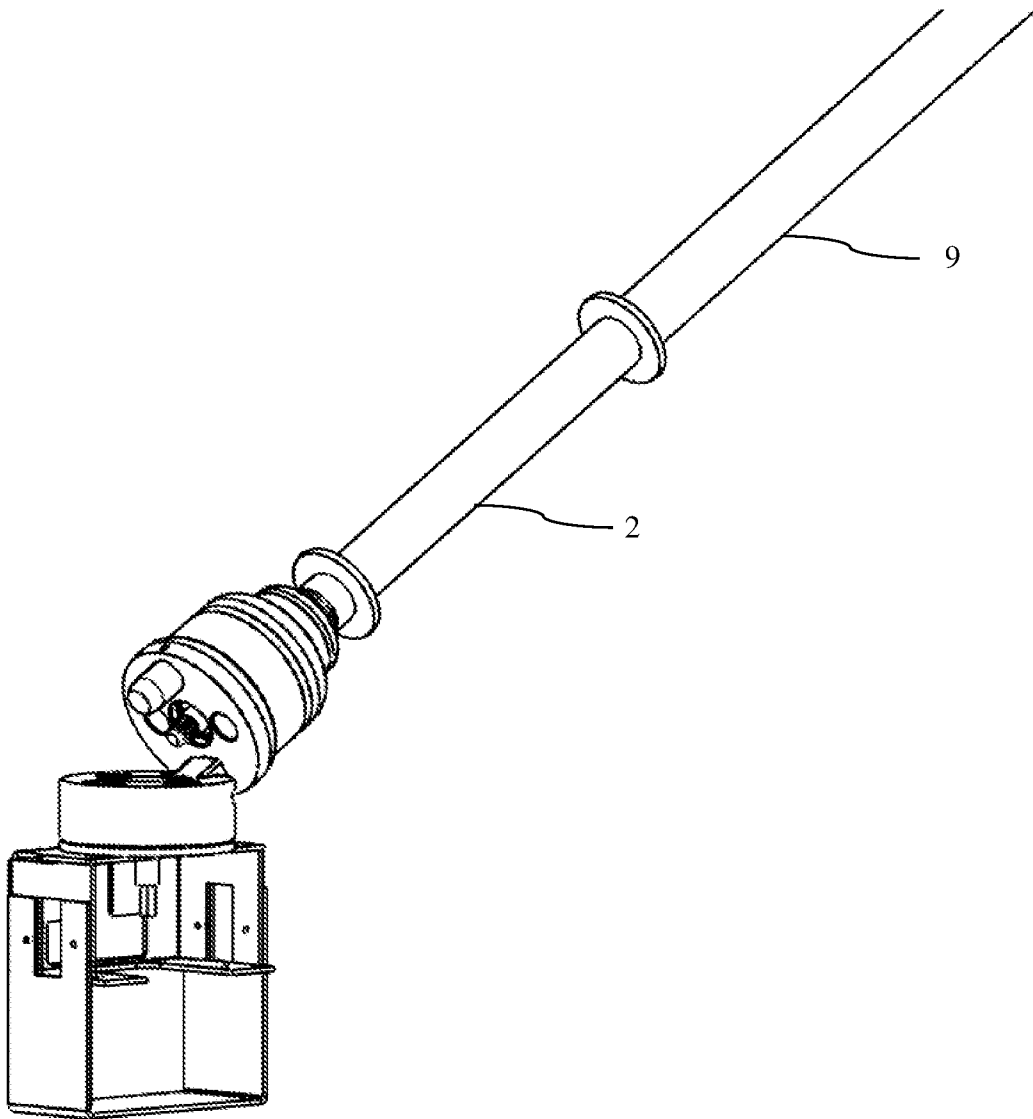


FIGURE 4

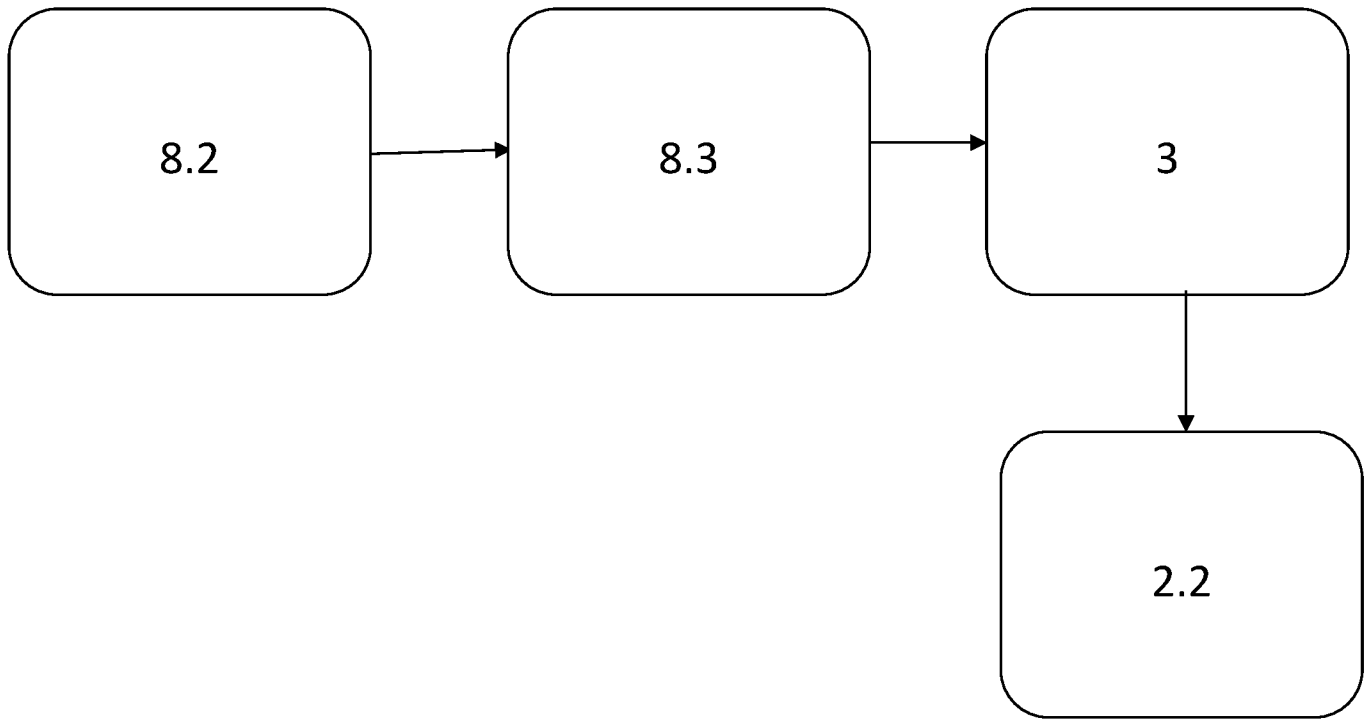


FIGURE 5

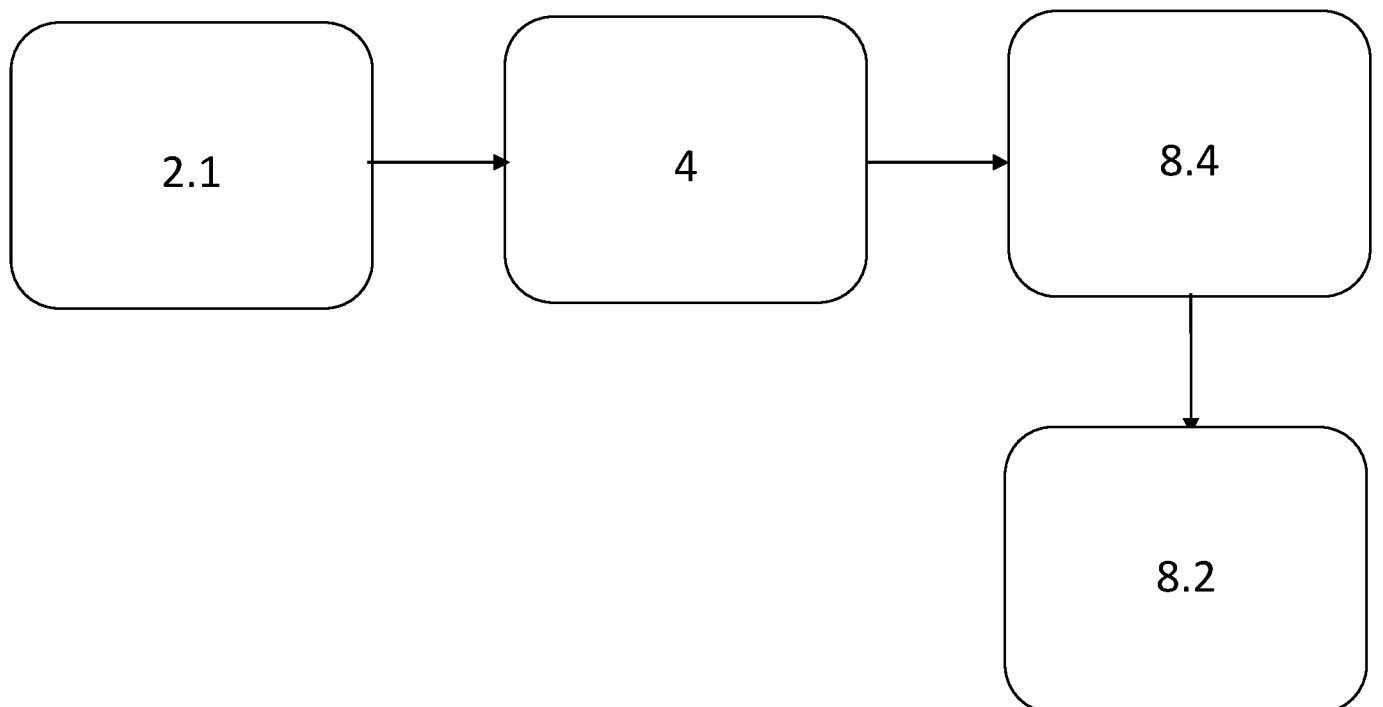


FIGURE 6

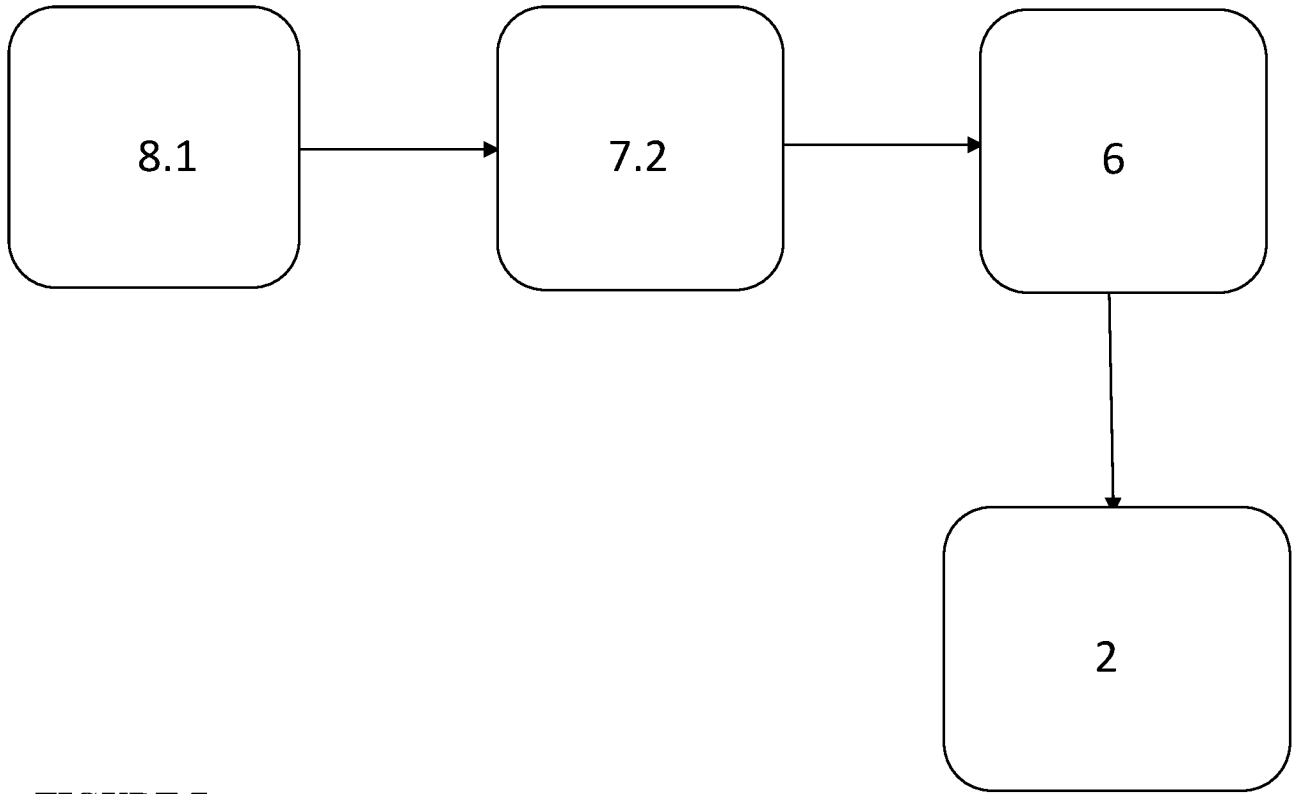
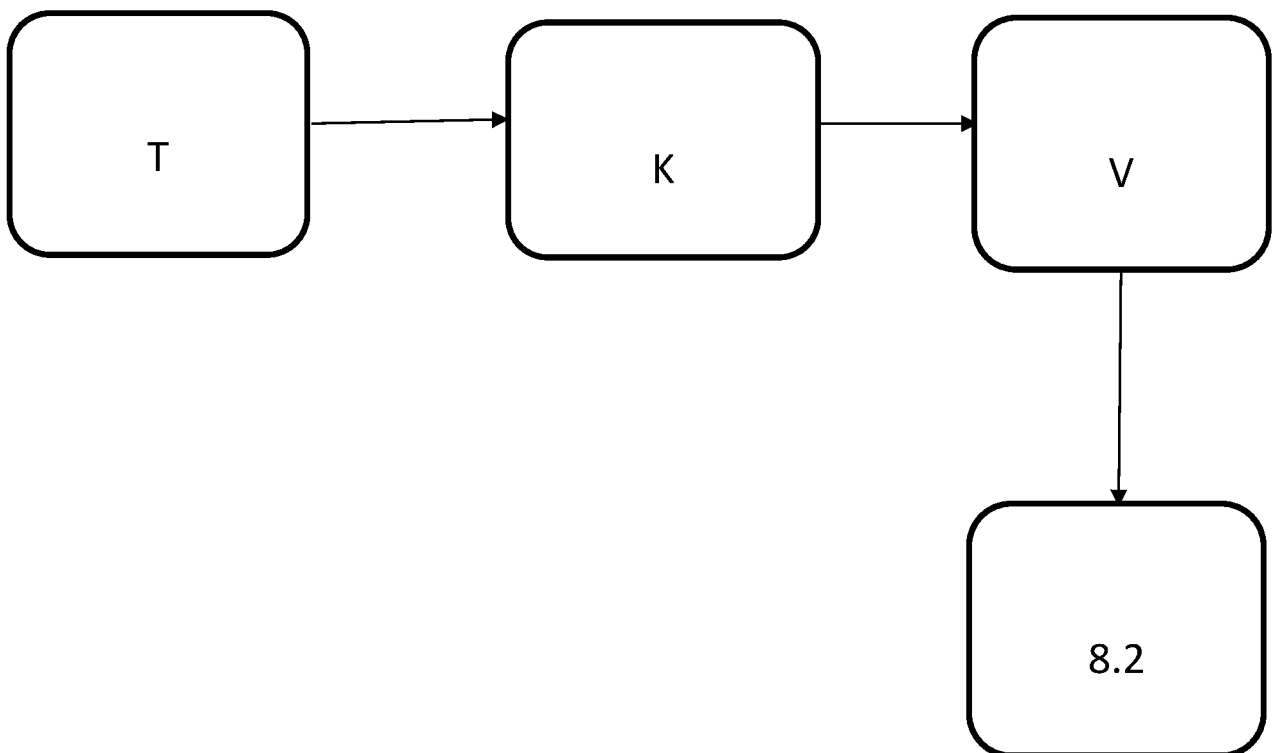


FIGURE 7



INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J37/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 102 46 305 A1 (TAN MUTFAK MAKINA GIDA SANAYI [TR]) 29 April 2004 (2004-04-29) figures 1,2 -----	1-4
A	US 5 918 534 A (MEDINA HENRY [US]) 6 July 1999 (1999-07-06) figures 1-5 -----	1-4
A	DE 20 2007 000560 U1 (KUHLBLANK MARTIN [DE]) 16 August 2007 (2007-08-16) figure 2 -----	1-4
A	US 4 190 100 A (WALLACE CHARLES H [US]) 26 February 1980 (1980-02-26) figures 4,7 -----	1-4
A	GB 2 189 586 A (MORAN DOUGLAS ENG) 28 October 1987 (1987-10-28) figure 2 -----	1-4

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See patent family annex.

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Date of the actual completion of the international search 2 July 2020	Date of mailing of the international search report 15/07/2020
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Fritsch, Klaus

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/TR2020/050122

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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			GB 2189586 A 28-10-1987
			JP S62294896 A 22-12-1987
