

June 23, 1931.

H. F. TAYLOR

1,811,191

SMOKE GENERATOR

Filed July 27, 1928

3 Sheets-Sheet 1

Fig. 1.

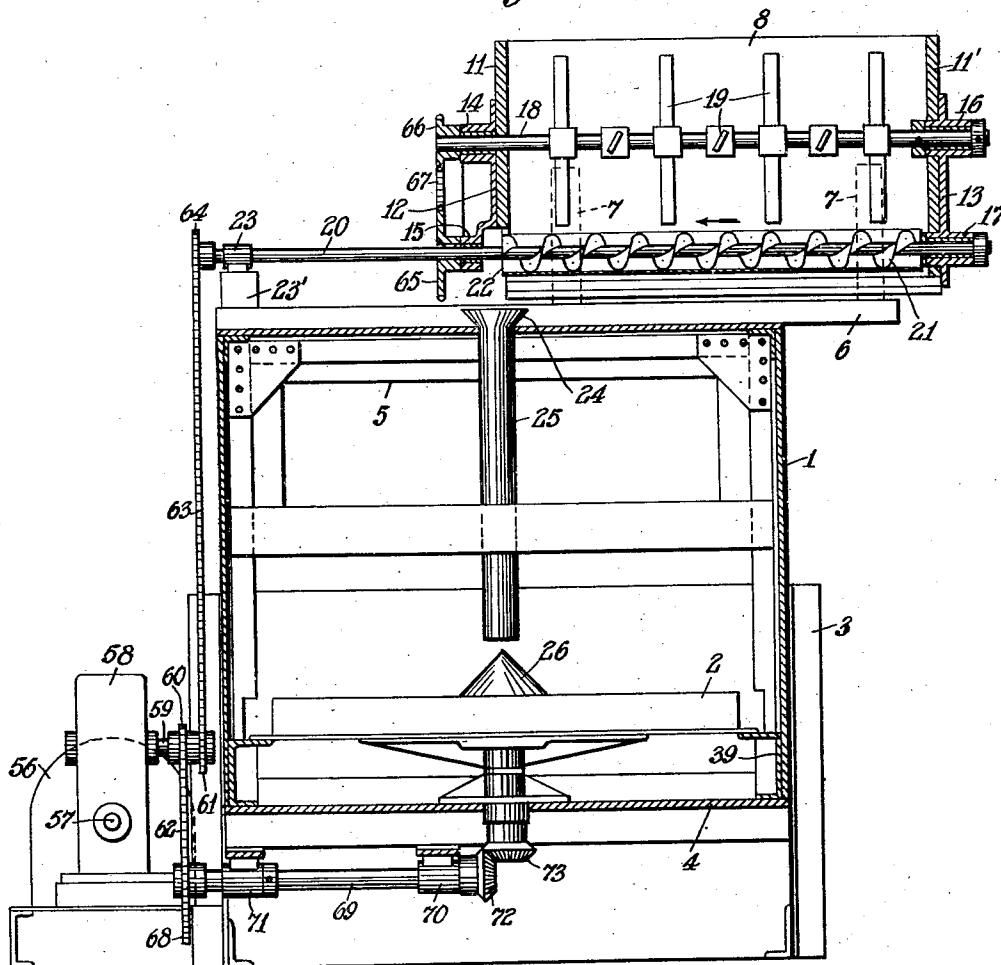
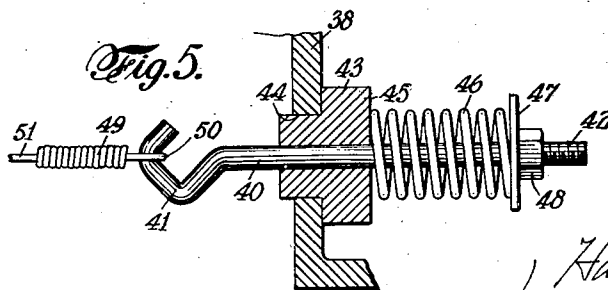


Fig. 5.



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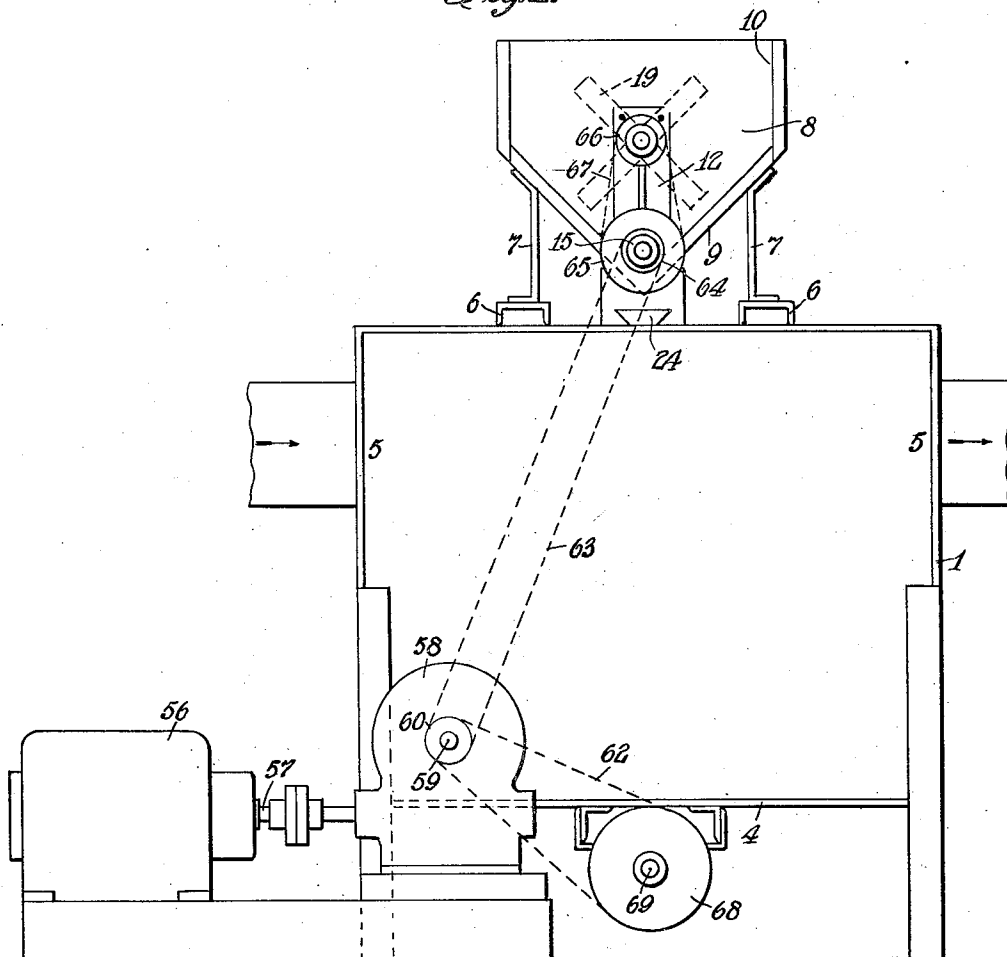
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3 Sheets-Sheet 2

Fig. 2.



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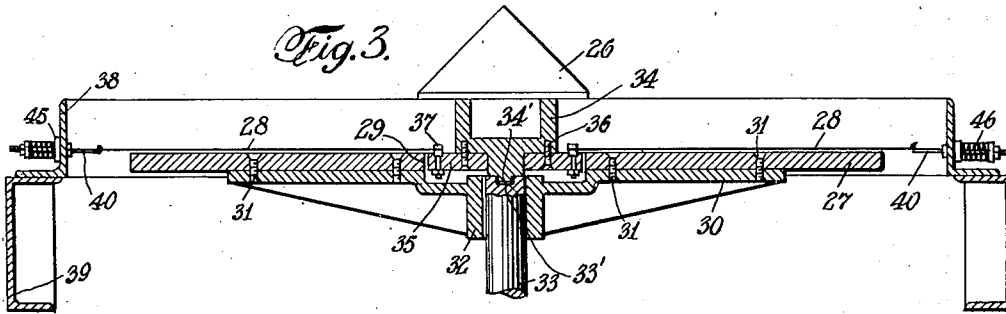
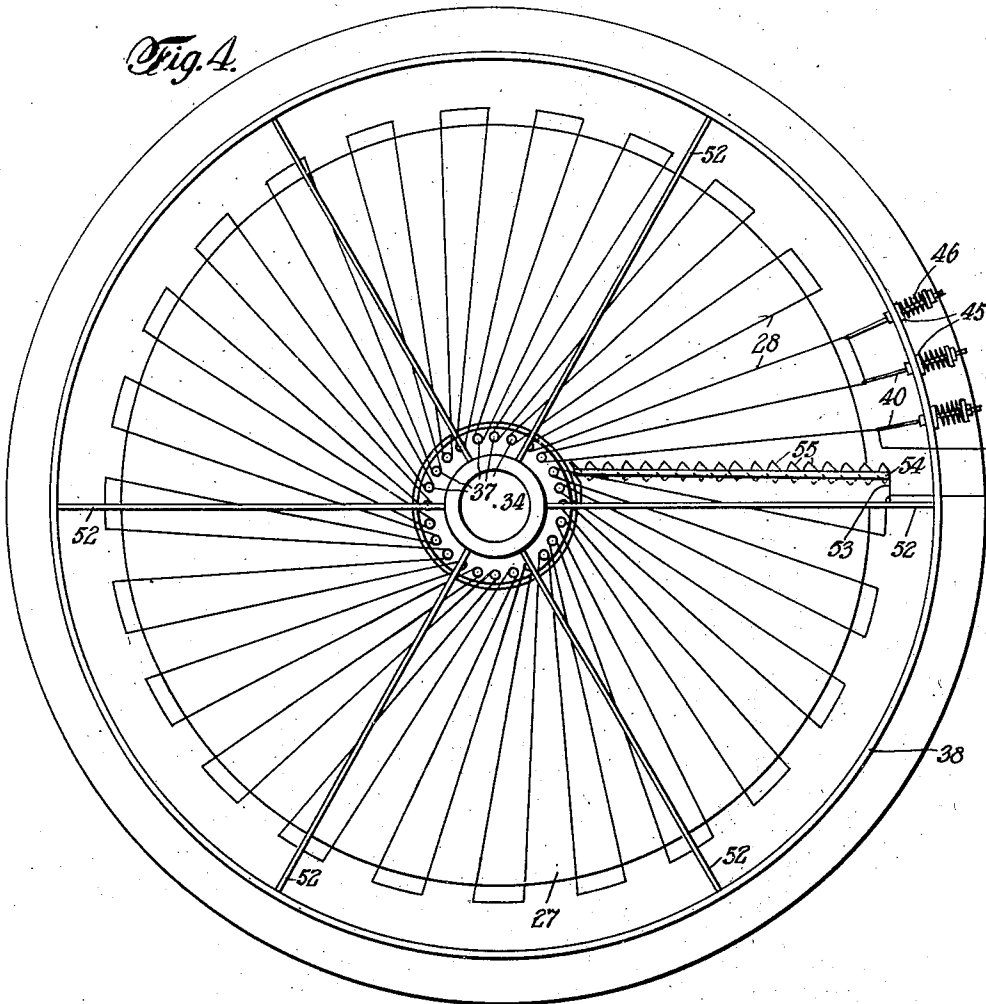
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SMOKE GENERATOR

Filed July 27, 1928

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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SMOKE GENERATOR

Application filed July 27, 1928. Serial No. 295,714.

This invention relates to a smoke generator, and more particularly to a smoke generator adapted to be used for the smoking of comestibles, such as meat, fish and the like.

with the decomposing elements and means to feed the fuel across said support and maintain the support substantially free from carbon and other residues of the fuel.

Further objects will appear from the following description, appended claims and accompanying drawings in which:

Figure 1 is a vertical section of an apparatus embodying my invention.

Figure 2 is an end view of the apparatus illustrated in Figure 1.

Figure 3 is a detailed vertical sectional view of the fuel-decomposing means.

Figure 4 is a top plan view of the fuel-decomposing means as illustrated in Figure 3.

Figure 5 is a detailed view illustrating the manner of supporting the electrical resistance element.

The apparatus which constitutes this invention broadly comprises means for continuously supplying a regular amount of fuel (saw-dust) to a rotating support mounted beneath heating elements, whereby the fuel is maintained in contact with the heating elements, and means for feeding the fuel across the support and to maintain the support substantially free from carbon and the other residues of the fuel tending to adhere to the support.

Referring now to the drawings in which one modification of my invention is illustrated, the reference numeral 1 designates a housing in the lower portion of which the means 2 for decomposing the fuel into smoke is positioned. The housing is supported on a frame comprising the vertical uprights 3, and transverse bars 4, and is provided in its side walls near the top thereof with openings 5, whereby the smoke generated in the housing may be carried or led away from the housing, as explained in my copending application Serial No. 295,713 filed July 27, 1928. On the top of the housing are channel irons 6 to which brackets or legs 7 are fastened and which support and carry a feed hopper 8. The hopper 8, as illustrated, is trough-shaped, the walls 9 thereof being inclined to one another and the walls 10 being vertical and parallel to each other. On the end walls 11 and 11' of the hopper 8 there are brackets 12

In the art of smoking comestibles, smoke is produced from fuel by maintaining the fuel in a smoldering state. Prior to this invention the smoke was produced either in a lower portion of the smoke house or in a generator separate from the smoke house, the smoke being in the latter case conducted to the smoke house by means of ducts. In the generation of smoke as above described a substantial amount of heat evolved in the decomposition of the fuel was imparted to the smoke, thus raising the temperature of the smoke. When this smoke was employed for smoking, the comestibles were partially cooked and, after the smoking, exhibited a contraction, toughening and loss of weight. Furthermore, in these prior processes and apparatus the decomposing fuel remained substantially stationary. Occasionally the fuel was raked and in this manner different surfaces of the fuel were exposed for decomposition. Obviously the apparatus was inefficient and there was a great waste of fuel.

I have found that I can overcome the above-mentioned disadvantages by providing an apparatus which will generate smoke without materially increasing the temperature thereof. The apparatus which I have devised includes fuel-decomposing elements and means to regularly agitate the fuel during the decomposition thereof.

It is, therefore, an object of this invention to provide an apparatus for generating smoke without substantially increasing the temperature of said smoke.

Another object of this invention is to provide an apparatus in which the fuel is automatically and regularly agitated while in contact with the heating or decomposing elements.

A further object of this invention is to use electrical resistance elements as the decomposing elements.

A specific object of this invention is to provide an apparatus comprising a rotatable support adapted to maintain the fuel in contact

and 13 on which are formed or secured bearings 14, 15 and 16 and 17 respectively. A shaft 18 extending longitudinally of the hopper and having paddles or blades 19 is mounted in the bearings 14 and 16. The bearings 15 and 17, disposed beneath the bearings 14 and 16, carry a shaft 20, a portion of which extends through the bottom of the hopper and on which there are blades 21 constituting a conveyer and adapted to feed the fuel (saw-dust) introduced into the hopper to the left as indicated by the arrow in Figure 1, and through an opening 22 in the end wall 11 of the hopper 8. The shaft 20 is also supported by a bearing 23 mounted in a bracket 23' on top of the housing 1. The saw-dust, as it is fed from the hopper by the conveyer 21, is caused to fall into a flared end 24 of a delivery tube 25 disposed in the top of the housing and terminating adjacent a cone-like element 26 disposed adjacent the fuel-decomposing means 2.

The decomposing means 2, as previously described, is mounted in the lower portion of the housing 1 and consists of a rotatable support or table 27 above which the resistance elements 28 are mounted. The table 27 has a central opening 29 and is fastened to a spider 30 by means of screws or pins 31, and may be made of any suitable fire-resisting material. The spider 30 is formed with a journal 32 which is keyed to a shaft 33 whereby rotary motion, as hereinafter explained, is imparted to the spider 30 and, therefore, to the table 27. In the upper extremity of the shaft 33 there is a socket 33' in which a stud 34' of the carrier 34 loosely fits, whereby the carrier 34 is supported and not rotated by the shaft 33. At the upper end of the stationary carrier 34 there is the cone 26 which is adapted to distribute the charge of fuel fed to it by the tube 25. Within the central opening 29 of the table 27 there is a disk 35, keyed or otherwise fastened as by screws 36 to the carrier 34, and carrying pins 37, whose ends are insulated and adapted to receive and hold the resistance element 28.

The resistance element 28 is maintained in operative position by the pins 37 and a hook and spring arrangement, mounted in an annular ring 38 secured on brackets 39 fastened to the bottom and walls of the housing. The resistance-supporting means comprises a bar 40 having a hook end 41 and a threaded end 42. The bar portion passes through a bearing 43 rigidly mounted in an aperture 44 in the ring 38. The bearing 43 has a shoulder 45 against which a spring 46 acts. The other end of the spring 46 acts on a washer 47, the distance between said shoulder and said washer being controlled by a nut 48, which is movable on the threaded shank 42. In this manner the resistance elements may be maintained in a substantially taut position. An insulated member 49 is attached to the hook

41 by means of an eye 50. The other end of member 49 is also provided with an eye 51, through which the resistance element 28 passes. The resistance element 28 is made to alternately pass through the eyes 51 and around the pins 37, its ends being connected to a suitable source of power.

In the drawings the resistance element is shown as one continuous element alternately passing through the eyes 51 and around the pins 37. It is, however, within the scope of this invention to provide a plurality of resistance elements instead of one single resistance element as illustrated.

Above the table 27 and between the resistance elements 28 there are bars 52 the ends of which are secured in the annular ring 38 and the carrier 34. Suspended from these bars are arms 53 which carry bars 54 having blades 55, pitched at such an angle so that during the rotation of the table they will not only scrape and remove the carbon or other residue of the fuel remaining on the table but will also feed the fuel in a direction toward the outer periphery of the table and thus agitate and stir the fuel. In the drawings (see Figure 4) I have illustrated a plurality of such scraper and feeding mechanisms. The exact number of these elements is immaterial; any number desired may be used.

Movement and rotation to the various elements of the apparatus is obtained from a motor 56 through connections, as explained immediately hereafter. A shaft 57 leading from the motor is connected to a suitable speed-reducing mechanism 58. A shaft 59 extending from the speed-reducing mechanism has two sprocket wheels or pulleys 60 and 61 over which are trained two end belts or chains 62 and 63. The chain 63 is connected to a pulley or sprocket wheel 64 which drives the shaft 20 and, therefore, the screw conveyer 21. Adjacent the bearing 15 and keyed to shaft 20 is a pulley or sprocket wheel 65. Fastened to the end of shaft 18 adjacent the bearing 14 there is a sprocket wheel or pulley 66. A belt or sprocket chain 67 is trained over these two sprocket wheels or pulleys whereby the motion of the shaft 20 is imparted to the shaft 18 which causes the blades 19 to rotate and agitate the saw-dust or other fuel fed into the hopper. The chain 62, as previously pointed out, travels over the pulley or sprocket wheel 60 and across the pulley or sprocket wheel 68, whereby shaft 69, mounted in bearings 70 and 71 suspended from the bottom of the housing or transverse bars, is rotated. On the extremity of shaft 69 there is a bevel gear 72 which meshes with another bevel gear 73 whereby rotary motion is imparted to shaft 33. Since the table 27 is connected to the spider 30 and the spider 30 is keyed to the shaft

33, rotary motion is, therefore, imparted to the table 27.

In operation, the saw-dust or other fuel is fed into the hopper 8. The agitators 5 thoroughly mix the saw-dust and it is fed by means of the screw conveyer through the opening 22 in the bottom of the hopper to the supply tube 25 which delivers the saw-dust to the stationary cone 26. The cone 26 allows 10 the saw-dust to be positioned on the table 27. The latter then maintains the saw-dust in contact with the resistance element, whereby it is decomposed into smoke. The amount of electricity necessary to decompose the saw- 15 dust is regulated so that no unnecessary heat is imparted to the smoke thus produced. The smoke thus generated rises in the housing and passes out through the openings 5 into ducts which convey it to the smoke house.

20 During the decomposition of the fuel into smoke and the rotation of the table the pitched blades 55 will feed the saw-dust from its place of reception on the table to the outer periphery of the table. This feeding is regu- 25 lated so that when the saw-dust reaches the end of its travel it is substantially consumed. It is not unusual that when the fuel is decomposed and carbon or other residue adheres to the rotating table 27 the blades 55 30 are so positioned that they not only feed the saw-dust to the outer periphery of the rotating support but also scrape or remove the carbon or other residue from the rotating support and feed it together with the saw-dust 35 across the table. If desired a receptacle or other receiver may be placed beneath the other periphery of the table on the bottom of the housing and all residue fed thereto by the blades 55.

40 In the claims the term "heating element" is used. This terminology is intended to cover both one continuous element or a plurality of elements as above described.

Since it is obvious that various modifica- 45 tions may be made by any one skilled in the art without departing from the nature of the invention, this invention is not limited to the exact details above described except as defined in the appended claims.

50 I claim:

1. A smoke generator comprising an electrical heating element, a table mounted below said heating element for maintaining fuel in contact with said element, and means to rotate said table.

2. A smoke generator comprising an electrical heating element, a table mounted below said heating element for maintaining fuel in contact with said heating element, 60 means for rotating said table, means to agitate said fuel and to feed the fuel across said table.

3. A smoke generator comprising an electrical heating element, a table mounted below 65 said heating element adapted to main-

tain fuel in contact with said element, means to rotate said table and means to feed said fuel across said table.

4. A smoke generator comprising an electrical element, a table mounted below said 70 heating element adapted to maintain fuel in contact with said heating element, means to rotate said table and means to remove the carbon or other residue from said table.

5. A smoke generator comprising an electrical heating element, a table mounted below said heating element adapted to maintain 75 fuel in contact with said heating element, means to rotate said table, and means to remove the carbon and other residue from said table and to feed said fuel across said table.

6. A smoke generator comprising an electrical heating element, a table mounted below said heating element adapted to maintain 85 fuel in contact with said element, means to rotate said table and means to feed said fuel across said table, said means comprising a bar having inclined blades thereon.

7. A smoke generator comprising an electrical heating element, a table mounted below said heating element adapted to maintain 90 fuel in contact with said heating element, means to rotate said table and means to remove the carbon or other residue from said table, said means comprising scraper blades.

8. A smoke generator comprising an electrical heating element, a table mounted below said heating element adapted to maintain 95 fuel in contact with said heating element, means to rotate said table and means to remove the carbon or other residue from said table, said means comprising inclined scraper blades.

9. A smoke generator comprising an electrical heating element, a table mounted below 105 said heating element adapted to maintain fuel in contact with said heating element, means to rotate said table, and means to remove the carbon and other residue from said table and to feed said fuel across said table, 110 said means comprising inclined blades.

10. A smoke generator comprising a housing, a delivery tube mounted in said housing, a feed hopper mounted on said housing adapted to feed fuel into said delivery tube, a cone 115 mounted adjacent the exit end of said delivery tube, an electrical heating element, a rotatable table disposed beneath said heating element and adapted to receive the fuel from said cone and maintain it in contact with 120 said heating element, and means to feed the fuel across said table during the rotation of the latter.

11. A smoke generator comprising a housing, a delivery tube mounted in said housing, 125 a feed hopper mounted on said housing adapted to feed fuel into said delivery tube, a cone mounted adjacent the exit end of said delivery tube, an electrical heating element, a rotatable table disposed beneath said heat- 130

ing element and adapted to receive the fuel from said cone and maintain it in contact with said heating element, and means to feed the fuel across said table during the rotation of the latter and maintain the table substantially free from carbon and other residues of the fuel.

12. A smoke generator comprising a housing, a delivery tube mounted in said housing, a feed hopper mounted on said housing adapted to feed fuel into said delivery tube, a cone mounted adjacent the exit end of said delivery tube, an electrical heating element, a rotatable table disposed beneath said heating element and adapted to receive the fuel from said cone and maintain it in contact with said heating element, and means to feed the fuel across said table during the rotation of the latter, said means comprising a bar having inclined blades.

13. A smoke generator comprising an electrical heating element, said element including a resistance wire and means to maintain said wire in a substantially taut condition, a table mounted below said heating element adapted to maintain fuel in contact with said wire, means to rotate said table and means to feed said fuel across said table.

14. A smoke generator comprising a housing, a delivery tube mounted within said housing, a feed hopper mounted on said housing adapted to feed fuel into said delivery tube, means mounted adjacent the exit end of said delivery tube to distribute the fuel fed thereby, an electrical heating element, a rotatable table disposed beneath said heating element and adapted to receive the fuel from said distributing means and maintain it in contact with said heating element, and means to feed the fuel across said table during the rotation of the latter.

In testimony whereof, I have affixed my signature to this specification.

HARDEN F. TAYLOR.

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