Nov. 17, 1959 G. I. WAHNISH 2,912,974

SMOKE-GENERATING APPARATUS

Filed April 21, 1958

FIG. 1.

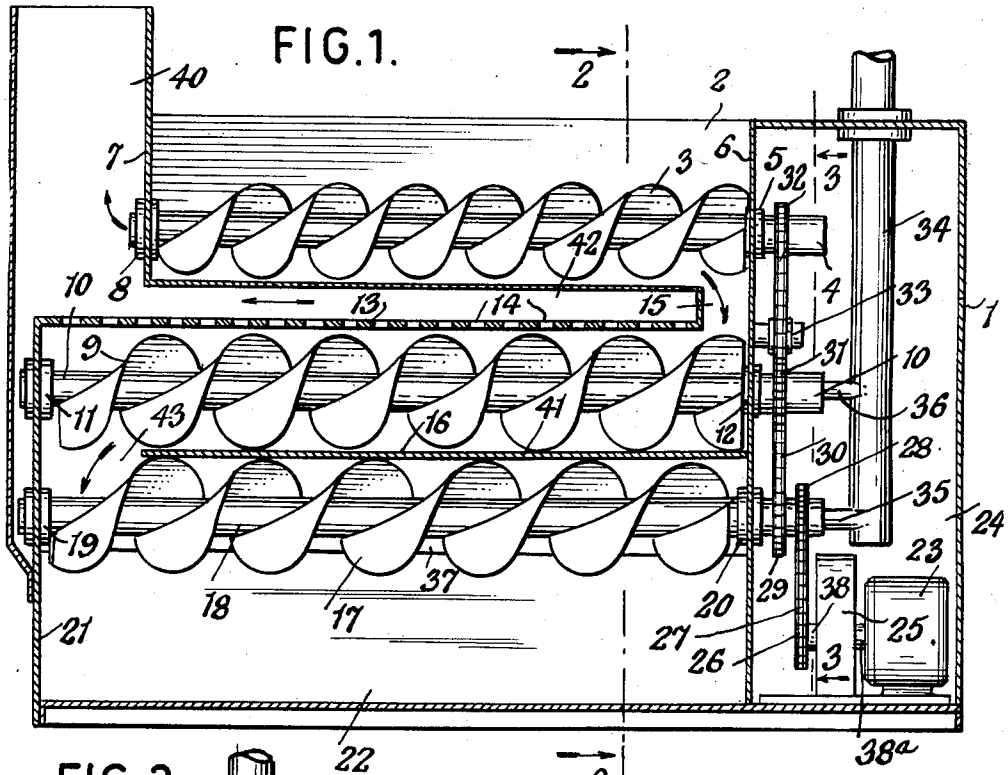


FIG. 2.

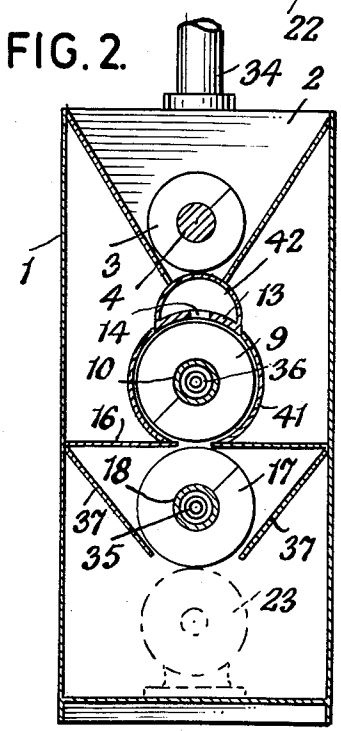


FIG. 3.

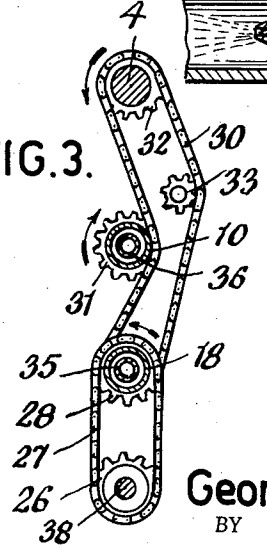
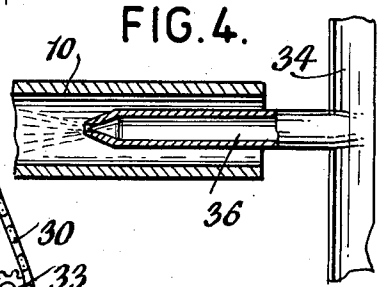


FIG. 4.



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SMOKE-GENERATING APPARATUS

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1 Claim. (Cl. 126—59.5)

This invention relates to smoke-generating apparatus of the character particularly adapted for use in connection with the smoking of meats and other smoked products.

It is an object of the invention to provide an apparatus of this character which will generate smoke by the smoldering of sawdust or possibly some other combustible material, and which will provide safety in use since the heating flame does not come into contact with the sawdust; which can be vented in a manner to insure disposal of gases and thus avoid the possibility of explosion, and which will be highly efficient in operation.

It is an object of the invention to provide, in this type of apparatus, a feeding means by which the sawdust is agitated, tumbled and fed while being caused to smolder, the smoldering taking place because of the fact that the heating means is located inside of the feeding means and acts to heat the same.

It is another object of the invention to provide, in this type of apparatus, a novel means of supplying heat for securing the smoldering of the sawdust, which heating means is operative within the hollow shaft of a revolving screw feeder, to thereby heat said shaft as well as heat the blade of the feeder, thus presenting a relatively large heated area to the sawdust while agitating and tumbling the same.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claim appended hereto.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed,

Fig. 1 is a vertical sectional elevation of a smoke-generating apparatus, constructed according to the invention;

Fig. 2 is a sectional view, taken substantially on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a sectional view, taken substantially on the line 3—3 of Fig. 1, looking in the direction of the arrows; and

Fig. 4 is a detail view showing one of the feeder shafts in section and the flame nozzle extending into the same.

Referring to the drawing, 1 indicates generally the housing in which the various parts of the apparatus are contained, the housing being composed of sheet metal. The upper portion of the housing is shaped to provide a hopper 2 into which the sawdust or other combustible material is deposited, either manually or by a suitable feeding device. Rotatably mounted within the hopper 2 is a spiral or screw feeder 3, the same having a shaft 4 mounted for rotation in suitable bearings 5 and 8, the bearing 5 being provided in the wall 6 of the housing, while the bearing 7 is provided in the wall 7, the latter wall constituting an element of the smoke outlet 40.

Located below the spiral feeder 3 is another similar feeder, indicated at 9 and provided at one end with the bearing 11 and opposite end with a bearing 12, the hollow shaft 10 of this feeder being rotative in said bearings.

Situated below the feeder 9 is a third feeder 17, having its shaft 18 rotative in the bearings 19 and 20. The spiral feeder 9 is operative within a tube 41 provided at the top with a channel 42 which constitutes a smoke passage and communicates at one end with the smoke outlet or chimney 40. The wall 13 between the channel 42 and the interior of the tube 41 is perforated or apertured as indicated at 14 to allow passage of the smoke from the interior of the tube 41 to the channel 42, and from which the smoke passes to reach and flow out of the outlet or chimney 40.

The three spiral feeders 3, 9 and 17 are rotatively driven from an electric motor 23 shown as being located in a chamber or compartment 24 at one end of the housing 1, although the motor may be remotely situated if desired. The shaft 38a of the motor enters the casing 25 containing a suitable gear reducer, which has its shaft 38 provided with a sprocket 26 engaged by a chain 27 which passes around a sprocket 28 provided on the hollow shaft 18 of the lower feeder 17. Shaft 18 also carries a sprocket 29 engaged by a chain 30 which also engages with a sprocket 31 provided on the hollow shaft 10 of the spiral feeder 9. Chain 30 continues upwardly to pass around sprocket 32 carried by the shaft 4 of the upper spiral feeder 3. An idle sprocket 33 also engages the chain, as is clearly shown in Fig. 3. This arrangement is such that the three spiral feeders are driven slowly during combustion of the sawdust, the upper feeder 3 being driven counterclockwisely as viewed from the right in Fig. 1; the feeder 9 being driven clockwisely and the lower feeder 17 being driven counter-clockwisely.

The spiral feeders 9 and 17 are heated by suitable heating means, such as gas burners 35 and 36 which are attached to a gas manifold 34 leading from a suitable source of the gas. The gas nozzle or burner 35 projects into the interior of the hollow shaft 18, while nozzle 36 projects into the interior of the hollow shaft 10 substantially as shown in Fig. 4. These burners may extend to a greater or lesser extent into the interior of the shafts 10 and 18 according to specific heating requirements and they may also be thermostatically controlled.

At their ends remote from the ends at which the burners enter, the hollow shafts 10 and 18 are open, said open ends entering into the smoke outlet or chimney 40 so that fumes and gases from the burners may pass out of the housing. As an alternative, the outlets of the hollow shafts may be provided with a separate passage carrying off the fumes and gases.

From the foregoing, the operation of the improved smoke-generating apparatus will be readily understood. The sawdust or other suitable combustible material is deposited into the hopper 2, either manually or by mechanical feeding means, wherein it is picked up by the feeder 3 and carried toward the right to be moved through the passage 15 that establishes communication between the interior of the hopper 2 and the tube 41 wherein the feeder 9 is located. The feeder 9 picks up the sawdust and tends to move it toward the left and due to the intense heat of the feeder 9 provided by the gas flame within it, the sawdust smolders while being tumbled and agitated by the feeder 9, and generates considerable smoke. The smoke thus produced passes through the apertures 14 into channel 42 and from thence out through the chimney 40. Since the feeder 9 is heated by an internal heating arrangement, the entire feeder becomes heated through heat transfer thus providing a substantially large heating area and greatly improves the efficiency of the combustion and smoke process.

As the sawdust reaches the left end of the conveyor or feeder **9**, it is to a great extent reduced to ash and residue and it moves through the passage **43** as indicated by the arrow in said passage to be picked up by the feeder **17** and moved toward the right while descending into a collection chamber **22** that may contain a removable drawer or other suitable receptacle into which the ashes will be collected. Since the feeder **17** is heated similarly to the feeder **9** it will co-operate therewith in smoldering the sawdust or so much of it has not been reduced to ashes by contact with the feeder **9**. As a result, the material which reaches the collection chamber **22** to be reecived in the drawer or other receptacle placed therein will be almost completely ashes. To distribute the ashes and residue into the collection chamber or in the drawer provided therein, angular baffle plates **37** are provided along the sides of the spiral feeder **17**.

Having described a single embodiment of the invention, it is obvious that the same is not to be restricted thereto since various changes may be made without departing from the spirit of the invention. For example, the spiral feeders may be made of far greater length than those shown; the driving means and motor for the feeders may be located remotely and away from the heaters and heat supply; the driving means may be gearing instead of chain-and-sprocket and various other departures made from the specific disclosure, and as is comprehended by the terms of the claim appended hereto.

What I claim is:

A smoke-generating apparatus comprising, a housing having a hopper in its upper end, a plurality of spiral feeders, one of said feeders being operative in the hopper and the remainder of the feeders being operative in the housing below the hopper and below the first-mentioned feeder, the feeders located below the hopper each having a hollow shaft, a flue connected with the interior of the housing, each of the hollow shafts having one end in communication with the flue, a flame-type burner located at the opposite end of the hollow shafts, said burner having nozzles entering into each of said hollow shafts to thereby heat said shafts to an extent sufficient to cause smoldering of combustible material moved by rotative movement of the spiral feeders.

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