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(57) Abrégé/Abstract:
The inventive subject matter is directed toward a pyrolytic waste treatment system comprising a pyrolysis chamber and a movement mechanism adapted to move waste through the pyrolysis chamber at different speeds along the length of the pyrolysis chamber.

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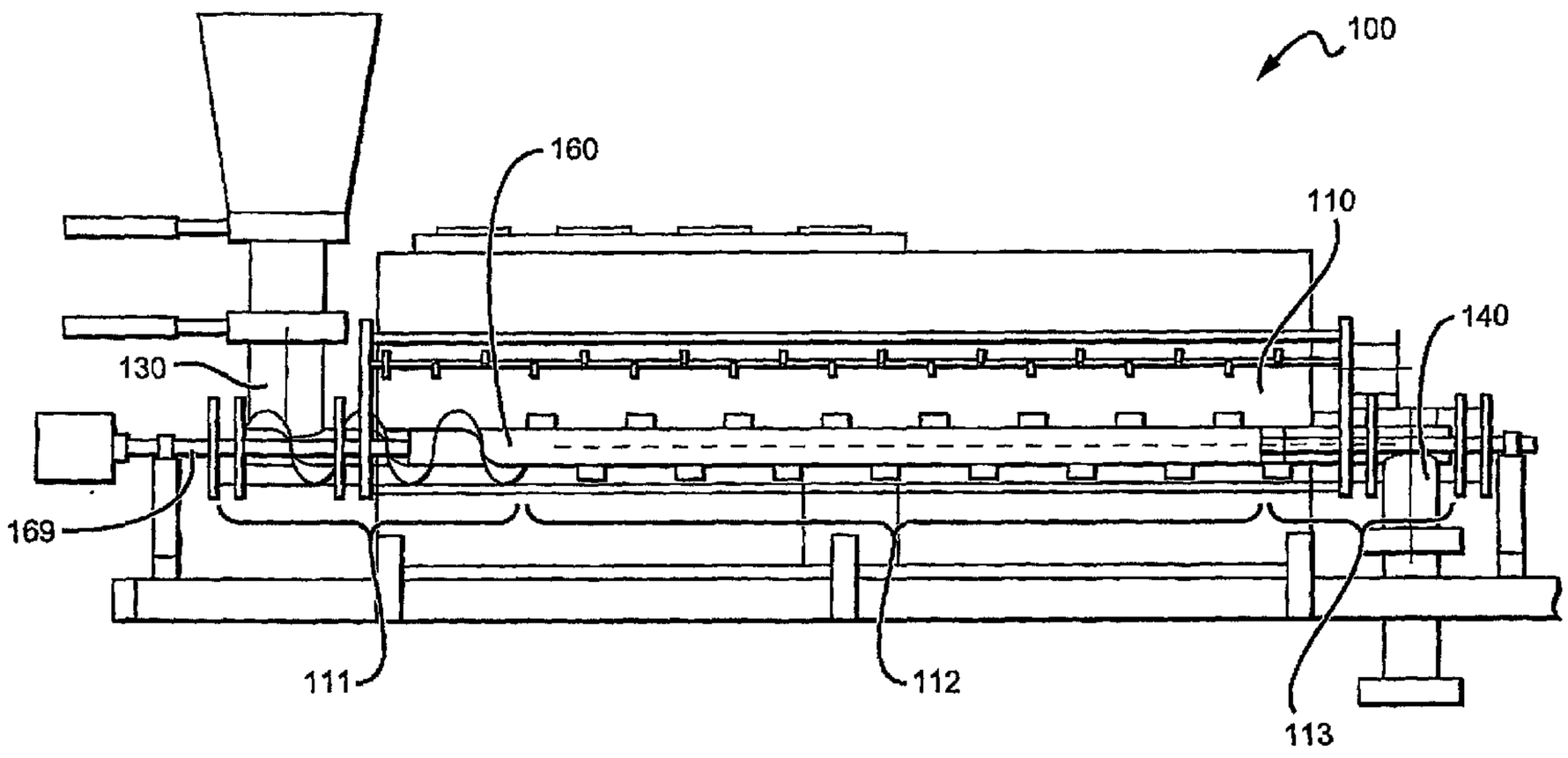

(57) Abstract: The inventive subject matter is directed toward a pyrolytic waste treatment system comprising a pyrolysis chamber and a movement mechanism adapted to move waste through the pyrolysis chamber at different speeds along the length of the pyrolysis chamber.

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VARIABLE SPEED PYROLYTIC WASTE TREATMENT SYSTEM

Field of The Invention

The field of the invention is pyrolytic waste treatment.

Background of The Invention

Pyrolysis is a known method for treatment of waste. Examples of pyrolytic waste treatment systems can be found in U.S. Patent Nos. 4,759,300, 5,653,183, 5,868,085, and 6,619,214. Unlike incineration, pyrolysis is the destructive decomposition of waste materials using indirect heat in the absence of oxygen. Burning wastes through incineration with direct flame in the presence of oxygen can be explosive, causing turbulence in the burning chamber, which fosters a recombination of released gases. Waste destruction in an oxygen-rich atmosphere makes conversion far less complete, is highly inefficient and creates harmful substances.

In contrast, the pyrolytic process employs high temperature in, most desirably, an atmosphere substantially free of oxygen (for example, in a practical vacuum), to convert the solid components of waste to a mixture of solids, liquids, and gases with proportions determined by operating temperature, pressure, oxygen content, and other conditions. The solid residue remaining after pyrolysis commonly is referred to as char. The vaporized product of pyrolysis is often further treated by a process promoting oxidation, which "cleans" the vapors to eliminate oils and other particulate matter there from, allowing the resultant gases then to be safely released to the atmosphere.

What has long been needed and heretofore has been unavailable is an improved pyrolytic waste treatment system that is highly efficient, is easy to maintain, is safe, reliable and capable of operation with a wide variety of compositions of waste materials, and that can be constructed and installed at relatively low cost. The thrust of the present invention is to provide such an improved pyrolytic waste treatment system.

Summary of the Invention

The present subject matter is directed toward a pyrolytic waste treatment system in which a movement mechanism is used to move waste through the pyrolysis chamber at various rates along the length of the pyrolysis chamber.

In another aspect, a method of pyrolyzing waste in an elongated chamber comprises moving the waste through the chamber at different rates along the length of the chamber.

Various features, aspects and advantages of the present invention will become more apparent from the following detailed description of preferred embodiments of the invention, along with the accompanying drawings in which like numerals represent like components.

Brief Description of The Drawing

Fig. 1 is a schematic of a pyrolytic waste treatment system.

Detailed Description

In **Fig. 1**, a pyrolytic waste treatment system 100 generally comprises a pyrolytic chamber 110 and a waste movement mechanism 160.

It is contemplated that it would be beneficial to vary the rate of movement of material through a pyrolysis chamber. In particular, material might move at a slower rate when it first enters the chamber and move at a faster rate after it has been heated and as is moved toward the chamber exit. It is contemplated that the use of paddles or a screw in which the pitch of the paddlers or the screw threads varies from one of the chamber to the other would prove beneficial. It should be recognized that other methods and devices may be used to move material through the chamber including, for example, using gravity, magnetism, and forced air. With regard to using magnetism, it is further contemplated that a product could be statically charged within a magnetic field. Other methods and devices are also contemplated so long as they move the product through the chamber and are in accordance with the inventive concepts described herein.

It is preferred that the speed at which waste moves through the chamber 110, and the temperature of the chamber 110 will both vary along the length of the chamber 110. At least in part in order to minimize heat loss, the ends of the chamber are generally cooler than portions of the chamber closer to the center of the chamber. As such, waste movement mechanism 160 varies along the length of pyrolysis chamber 110 to increase movement speed at the cooler ends, and to slow it down in the active heating region.

In section 111 of chamber 110, mechanism 160 comprises screw conveyor section 961 adapted to move waste quickly through section 111 away from waste inlet 130. In section 112, where active heating occurs, mechanism 160 comprises a first paddle section 962 wherein the paddles are oriented primarily to agitate, mix, and expose waste to heat rather than move it along the chamber 110. Movement of waste through section 112 occurs to a large extent from being pushed by waste moving into section 112 from section 111. In section 113, a second paddle section 163 has paddles oriented to move waste along section 113 to char outlet 140. The screw conveyer and paddles are coupled to, and may be integrally formed with, a drive shaft 169.

Screw conveyor section 161 of mechanism 160 is in some embodiments about 5 feet long, and the screw blades are pitched at varying degrees. In some embodiments, section 162 is about 20 feet long, and comprises approximately 42 paddles, wherein at least some of the paddles are oriented such that at least one side is substantially parallel to the center axis of shaft 169. In contrast, the section 163 of mechanism 160 (in some embodiments the last 5 feet of mechanism 160) of paddles system are pitched/angled to move the waste that has already reached the proper temperature quickly out of the actively heated zone.

Although a movement mechanism comprising a screw and paddles mounted to a single drive shaft is shown, alternative embodiments may use alternative apparatus and or methods to vary the speed at which material moves through pyrolysis chambers. As an example, some embodiments may utilize multiple movement mechanisms rather than a single movement mechanism. Others may utilize paddles along the entire length of the chamber, may utilize

paddles followed by a screw conveyor, may utilize only a screw conveyor, or may utilize an entirely different type of mechanism such a one or more flat conveyers.

A pyrolytic waste treatment system, particularly a continuous feed system adapted to move waste being treated at different speeds along the length of a pyrolysis chamber. Variances is speed my result from varying the pitch of paddles and/or screws used to move the waste along the length of the pyrolysis chamber.

Energy savings and improved treatment can be achieved in a pyrolysis treatment system which varies the rate of movement of material through a pyrolysis chamber. In particular, material moving material at a slower rate when towards the center of the chamber relative to when it first enters the chamber and when it approaches the chamber exit minimizes heat losses at the chamber entrance and exit while insuring the waste is adequately heated for treatment. Varying the rate of movement may be achieved through the use of paddles or a screw in which the pitch of the paddles or the screw threads varies from one end of the chamber to the other.

Thus, specific embodiments and applications of a pyrolytic system having been disclosed. It should be apparent, however, to those skilled in the art that many more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the appended claims. Moreover, in interpreting both the specification and the claims, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "comprises" and "comprising" should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A system for pyrolizing a waste, comprising:
a pyrolysis chamber having a screw conveyor section and a paddle section.

2. The system of claim 1 wherein the screw conveyor section includes first and second screw blades, the first blade pitched at a different angle from the second blade.

3. The system of claim 1 wherein the paddle section includes first and second paddles, the first paddle pitched at a different angle from the second paddle.

4. The system of claim 3, further comprising a brush that extends from the first paddle.

5. The system of claim 3, wherein the first and second paddles are further pitched such that the waste moves through the pyrolysis chamber at a faster rate closer to an end of the chamber than farther from the end.

6. The system of claim 1, wherein the screw conveyor section and the paddle section are coupled to a common shaft extends along a length of the pyrolysis chamber.

7. The system of claim 6, wherein the paddle section comprises a paddle that is disposed more medially along the shaft than the screw conveyor section.

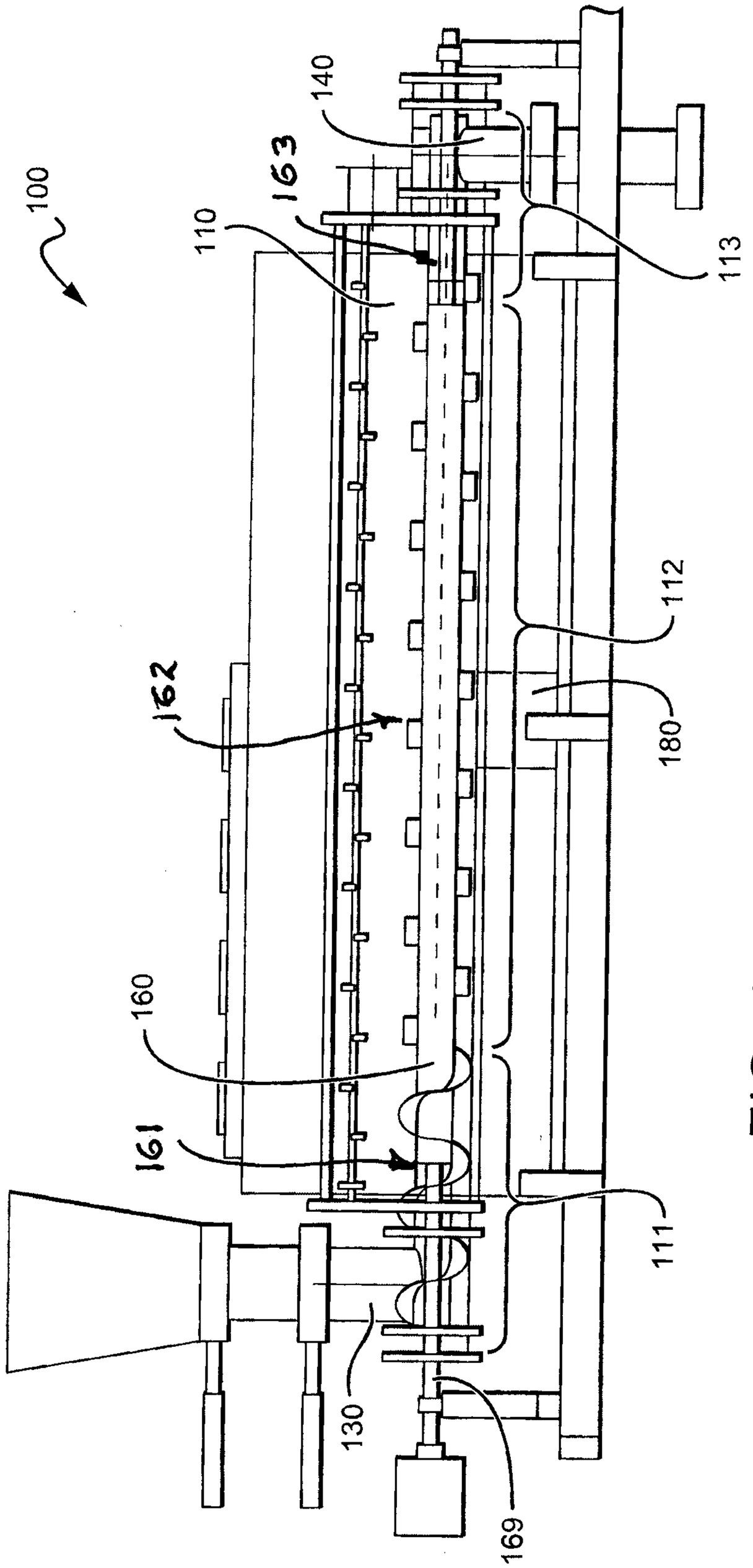

FIG. 1

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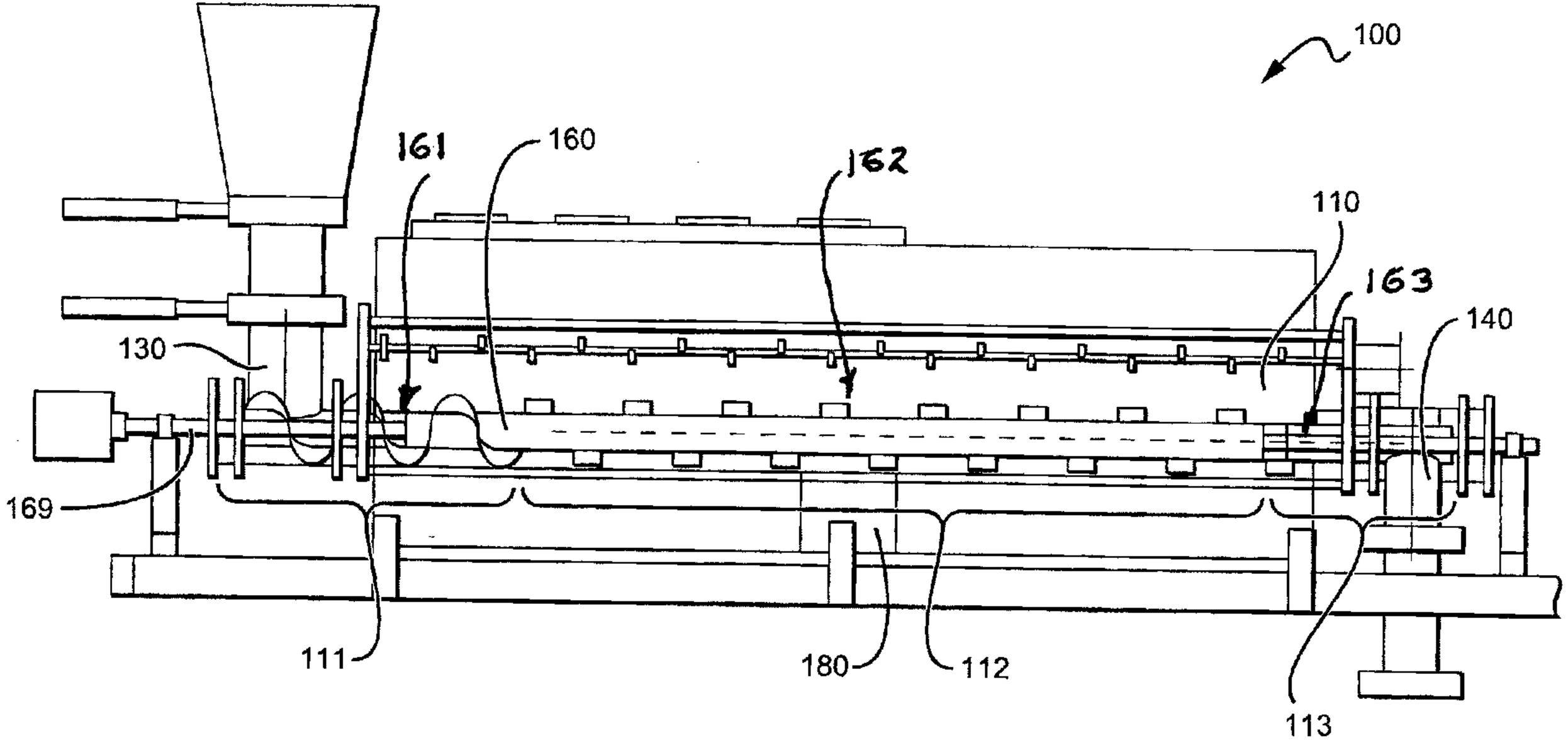
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