

April 3, 1951

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2,547,086

HEATING DRUM

Filed June 21, 1947

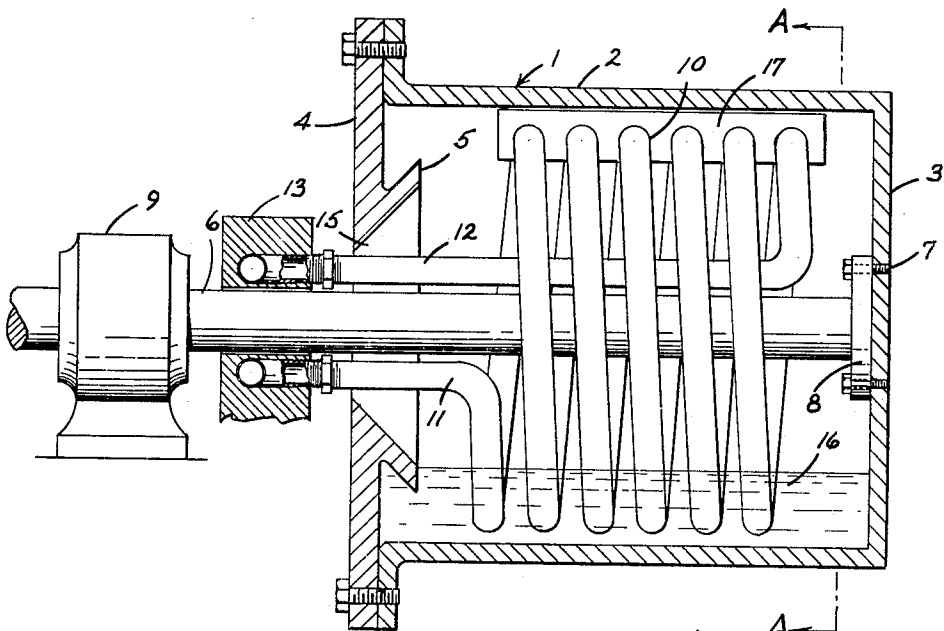


FIG. 1

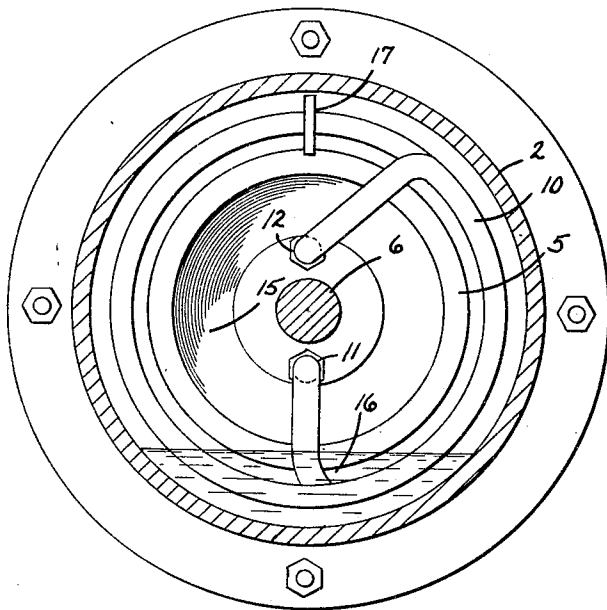


FIG. 2

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2,547,086

HEATING DRUM

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Application June 21, 1947, Serial No. 756,153

2 Claims. (Cl. 257—95)

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This invention relates to improvements in heating means. More particularly this invention relates to improvements in heating drums having means for efficiently and uniformly heating the drum.

In drying materials such as paper, fabric, yarns, filaments and the like sheet and fibrous materials, it is a common practice to pass the material over or between heated drums. These drums are generally heated by steam or other fluid and it has been found difficult to uniformly heat all parts of the drums. Also difficulty has been encountered in sealing the drums and preventing leakage of the heating fluid at the usual connection between the drum and the fluid supply.

This invention has for its principal object to provide heating drums having means for uniformly and efficiently heating the drum.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawing.

In the drawing:

Figure 1 is a longitudinal sectional view of an embodiment of the invention.

Figure 2 is another sectional view of the embodiment of the invention shown in Figure 1 the section being taken on the line A—A in Figure 1.

Referring to the drawing reference character 1 indicates generally a revoluble drum like member comprising a cylindrical member 2 of high heat conducting material, a closed head portion 3 and an annular end portion 4 having a central opening 15. The end portion is provided with the member 5 having the flared inner and outer portions that surround the central opening and extend into the drum.

The drum like member is centrally mounted on and fixed to the shaft 6 that extends through the central opening in the end portion, through the drum, to the head portion by the screw members 7 that extend through the head portion into the flangelike member 8 fixed to the end of the shaft.

The shaft is journaled in the bearing member 9 that also serves to support the shaft and the shaft is driven by suitable means that are not shown.

The drum like member is provided with heating means that comprise in part the stationary helical or spiral coil of tubing 10 made up of a plurality of spaced turns extending into the drum with the inlet portion 11 and outlet portion 12 of the coil fitted into the stationary connecting block 13 through an opening in which the shaft extends. The connecting block supports the coil

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which is of greater diameter than the central opening in the end portion of the drum like member and positions the coil substantially throughout its length spaced a short distance from the inner cylindrical wall of the drum like member.

The stationary connecting block is provided with suitable fittings whereby the inlet and outlet portions of the coil may be connected to supply and discharge conduits.

The coil may be heated by steam or other heated fluid or the coil may be an electrical heating means formed in the same shape and provided with appropriate electrical leads.

The drum is partly filled with a high heat capacity flowable heat conducting media 16 such as chemically inert high boiling oil, paraffine, mercury, or other liquid, or a dry flowable heat conducting media such as sand, metal powder, shot, or salt.

In the operation of this form of the invention the drum is rotated relative to the heating coil and the liquid or dry heat conducting media is carried around by the drum and by the action of centrifugal force forms a layer on the inner wall of the drum that is sufficiently deep to cover at least a portion of the heating coil and conducts the heat from the coil to the inner cylindrical wall of the drum.

The heating coil and the central opening in the end portion of the drum are of such diameter that an amount of heat conducting media may be placed in the drum sufficient to cover at least a portion of the heating coil when the drum is rotating which will not be discharged from the open end of the drum when the drum is not rotating.

The stationary coil causes some turbulence in the heat conducting media as the drum revolves so as to maintain the temperature of the heat conducting media substantially uniform throughout and to uniformly heat all parts of the cylindrical portion of the drum.

The drum is rotated in such direction that the helical coil tends to direct the heat conducting media toward the closed head portion away from the open end of the drum. The flared member surrounding the central opening in the end of the drum deflects heat conducting media away from the central opening and serves to prevent its discharge through the opening.

In order to increase the turbulence of the heat conducting media in the drum and to increase the mixing of the heat conducting media to maintain the temperature of all parts of the heat conducting media uniform, baffle means 17 may be

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provided. The baffle means may comprise a longitudinally extending riblike member fixed to the heating coil near the top and extending radially outwardly beyond the coil to a position just short of contact with the inner cylindrical wall of the drum like member, this distance being of the order of several hundredths of an inch. The baffle means removes all but a thin layer of the heat conducting media from the inner wall of the drum and causes the heat conducting media to cascade through the heating coil and uniformly conduct the heat from the coil to the heat conducting media and to the cylindrical portion of the drum.

While a preferred embodiment of the invention has been shown and described it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A heating means comprising a rotatable drum-like member having a cylindrical wall of heat conducting material and an end portion having a central opening, a stationary heating means positioned in the drum-like member extending around and spaced from the cylindrical wall thereof, a flowable heat conducting media in the drum-like member covering at least a portion of the heating means, means for deflecting heat conducting media away from the central opening in the end portion of the drum-like member comprising an outwardly flared member fixed to that end portion of the drum-like member surrounding the central opening and extending into the drum-like member and longitudinally extending baffle means carried by the heating means for directing heat conducting media into contact with the heating means.

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2. A heating means comprising a rotatable drum-like member having a cylindrical wall of heat conducting material, a closed end portion, and an end portion having a central opening, means for supporting the drum-like member extending through the central opening and fixed to the closed end portion, a stationary heating means positioned in the drum-like member extending around and spaced from the cylindrical wall thereof, a flowable heat conducting media in the drum-like member covering at least a portion of the heating means, means for deflecting heat conducting media away from the central opening in the end portion of the drum-like member comprising an outwardly flared member fixed to that end portion of the drum-like member surrounding the central opening and extending into the drum-like member and longitudinally extending baffle means carried by the heating means and spaced from the cylindrical wall for directing heat conducting media into contact with the heating means.

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