Feb. 5, 1929. 1,701,156

C. C. HERITAGE

INDUCTIVELY HEATED DRYING DRUM

Filed Feb. 10, 1927

Fig. 1

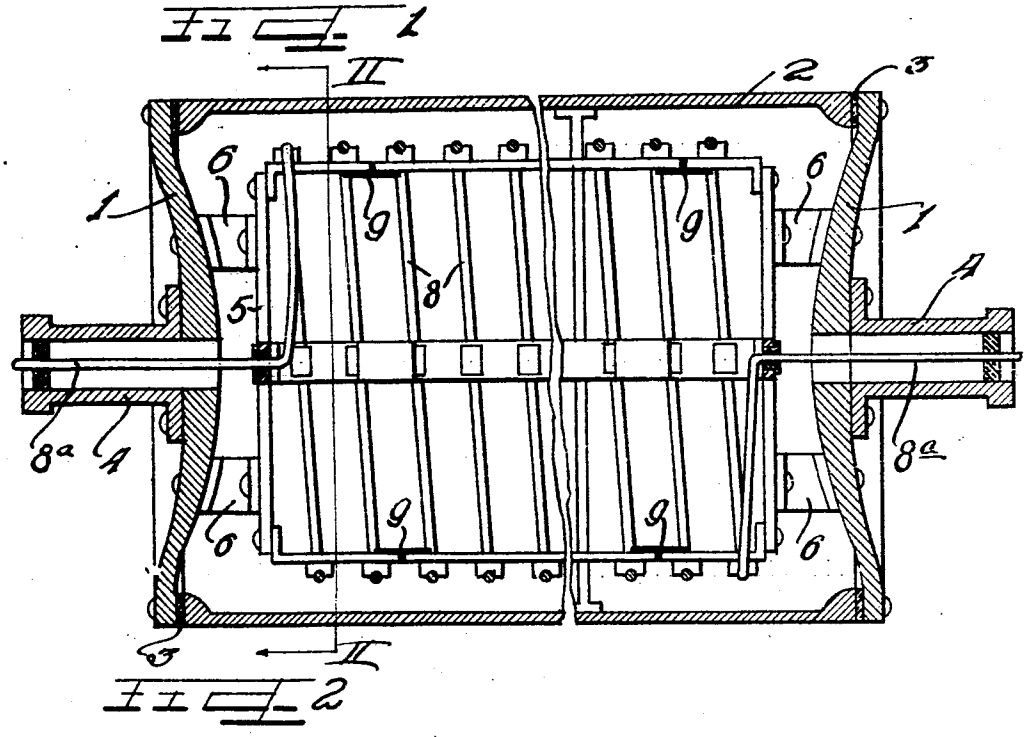


Fig. 2

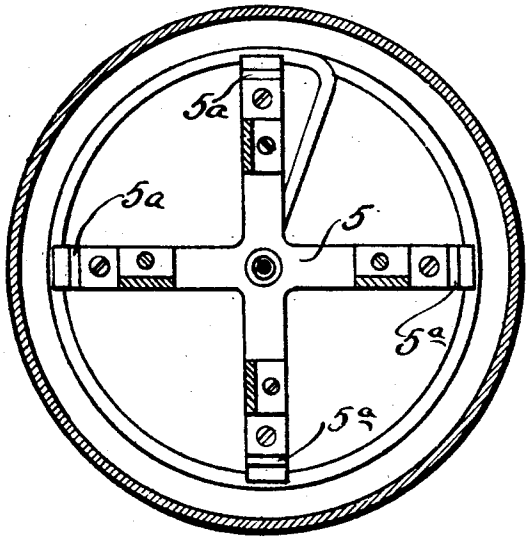
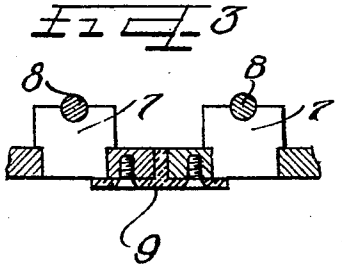


Fig. 3



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UNITED STATES PATENT OFFICE.

CLARK C. HERITAGE, OF CORNELL, WISCONSIN.

INDUCTIVELY-HEATED DRYING DRUM.

Application filed February 10, 1927. Serial No. 167,157.

This invention relates to an inductively heated drying drum and while devices embodying the present invention are capable of a wide field of application, the apparatus herein described is particularly adapted for the drying of paper, paper board and the like.

Drying drums for these and similar purposes have been heretofore quite generally heated by steam introduced into the interior thereof. As will be apparent, the steam heating of such apparatus involves many limiting factors and is difficult to accurately control under all conditions.

It is accordingly an important object of this invention to provide a drying drum or cylinder which is heated by an electric current induced in its shell and which obviates many of the difficulties and disadvantages attendant upon the use of steam as a heating medium.

It is a further important object of this invention to provide a drier drum having an insulated shell which forms the secondary of an alternating current transformer and which has heating currents induced therein by the action of alternating current flowing in a transformer primary coil inside said shell or drum.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a central vertical section taken through a drier drum embodying the principles of this invention with parts shown in elevation.

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is an enlarged detail section illustrating a method of mounting the primary windings.

As shown on the drawings:

The reference numeral 1 designates drum end pieces which are preferably of metallic construction and which act to support a metallic cylinder 2 in such a manner as to provide a cylindrical drum similar in external appearance to usual type drums. The metallic cylinder 2 is electrically insulated from the end pieces 1 by rings 3 of insulating material which are plainly shown in Figure 1. In order that the drum afforded by the end pieces 1 and the metallic cylinder 2 may be rotatably supported in suitable bearings such as provided in drier housings or the like, trunnions 4 are secured to the end pieces 1 in any desired manner. These trunnions 4 are preferably hollow for the purpose to be described hereinafter.

Supported inside the drum afforded by the end pieces 1 and the metallic cylinder 2 is a spider or framework which I have designated in general by the reference numeral 5. Said spider or framework 5 may be conveniently supported on brackets 6 secured to the insides of the end pieces 1 and mounted on longitudinal members 5^a. Forming a part of said framework 5 are a plurality of insulator blocks 7 which serve to support an electrical conductor 8 of copper wire or other suitable material wound on said framework in the form of a usual helical coil or, if desired, in the form of usual ring coils connected either in series or parallel and suitably controlled. The longitudinal members 5^a are preferably separated at any desired number of points intermediate their ends by suitable insulating members 9, a detail of such insulating members being shown in Figure 3. The ends of the coil formed by the conductor 8 may be led outwardly as at 8^a through the axial passages in the trunnions 4 and thence connected to a suitable source of alternating current electrical energy.

It will be apparent from the foregoing construction that when an alternating electric current is passed through the coil afforded by the wound conductor 8 that said current will induce in the single turn secondary afforded by the metallic cylinder or shell 2 an electric current of high amperage and low voltage in accordance with the well known principles of transformer operation. This electric current induced in the cylinder or shell 2 will, of course, raise the temperature thereof and it is obvious that the temperature may thus be raised to practically any desired degree required for practical drying purposes.

It is evident that when the heating of the cylindrical shell 2 is effected in this manner that the temperature of said shell may be very accurately controlled, and it is further evi-

dent that much higher temperatures may be obtained in this manner than would be possible with superheated or high pressure steam due to the limitations of the mechanical construction of drums of this kind in withstanding high pressures. It is further evident that the device can be designed to operate at a much higher speed of rotation. It is also possible to make the cylindrical member or shell 2 of lighter material than would be practicable with steam heated driers. Many other advantages will be obvious to those skilled in the art.

The shell 2 may be opened or closed at its ends as conditions require. The interior of the cylinder primary may also be cooled if desired by forcing air through the trunnions. It is further obvious that the primary current carrying element need not be rotatable relative to the shell to accomplish the objects of this invention.

Also, as I have previously indicated herein, the apparatus of this invention is particularly adapted for use in connection with drying of paper, board and the like due to the fact that speedier operation and an economy of space may be obviously obtained as well as a better control of the drying temperatures and consequently, of the moisture content of the dried product. It is also apparent that apparatus involving the principles of this invention will readily lend itself to a variety of other uses.

I am aware that numerous details of this invention may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted, otherwise than necessitated by the prior art.

I claim as my invention:

1. A drier, comprising a rotatable cylindrical transformer secondary element having supporting end members secured thereto and insulated therefrom, hollow trunnions secured to the end members, a frame within the said secondary element supported by the aforesaid end members, and having a primary transformer coil wound thereon and insulated therefrom, and current conducting means connected to the said primary element extending through the said hollow trunnions.

2. A drier, comprising a rotatable cylindrical transformer secondary element having supporting end members secured thereto and insulated therefrom, hollow trunnions secured to the end members, a frame within the said secondary element supported solely by the aforesaid end members, and having a primary transformer coil wound thereon and insulated therefrom, and current conducting means connected to the said primary element extending through the hollow trunnions.

3. A drier, comprising a rotatable cylindrical transformer secondary element having supporting end members secured thereto and insulated therefrom, a frame within the secondary element supported by the said end members having a primary transformer coil wound thereon and insulated therefrom, hollow trunnions secured to the aforesaid end members, conductor means connected to the said primary coil extending through said trunnions, the said trunnions adapted to function as rotatable supports for the said cylindrical element and to conduct air to the interior of the drier.

4. A drier, comprising a rotatable transformer secondary element, supporting members secured to the said secondary member and insulated therefrom, an air-cored primary transformer element within and in spaced relation to the said secondary and mounted on the said supporting members, and conduit means on the said supporting members to conduct air to the interior of the said drier.

5. A drier, comprising a rotatable transformer secondary element, supporting members therefor secured to the said secondary element and insulated therefrom, and an air-cored primary transformer element within and in spaced relation to the said secondary element mounted on the said supporting members.

In testimony whereof I have hereunto subscribed my name at Cornell, Chippewa County, Wisconsin.

CLARK C. HERITAGE.