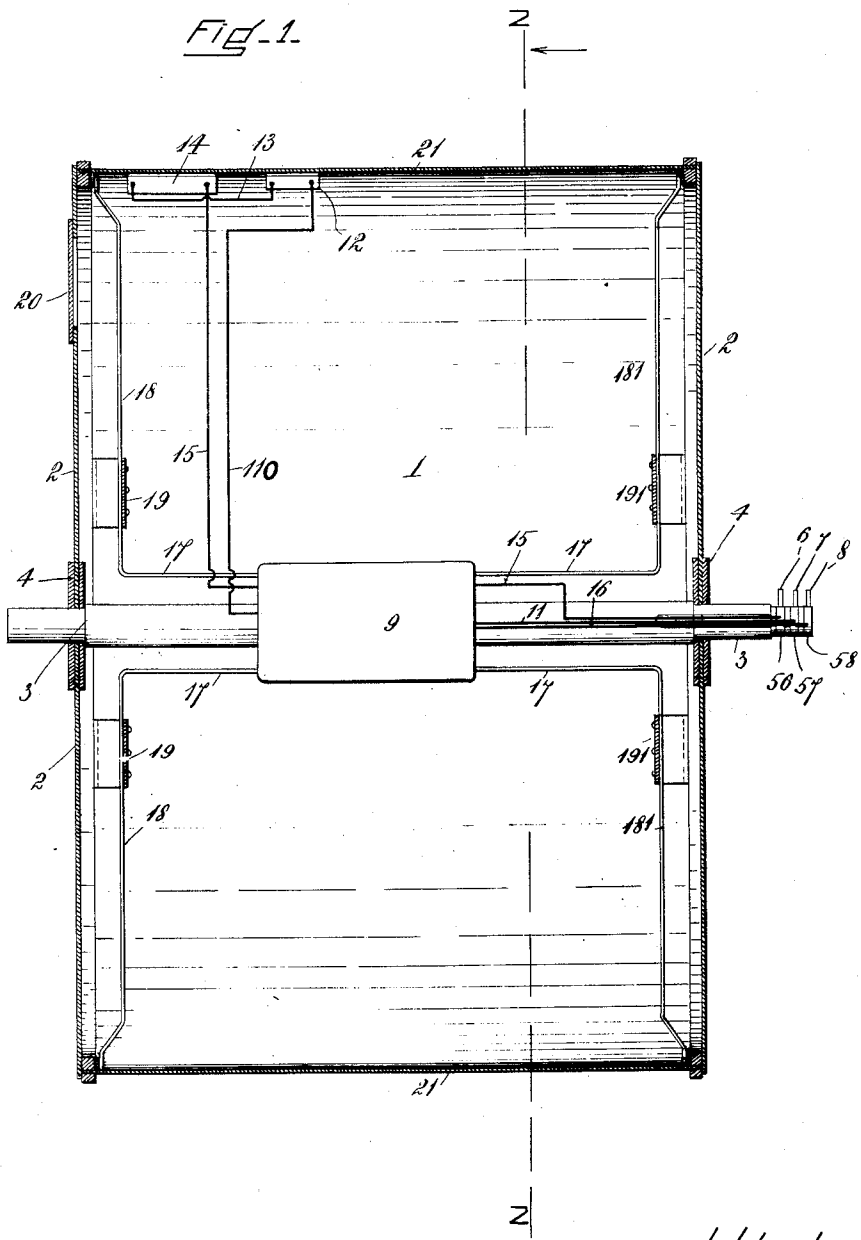
Jan. 15, 1924. 1,480,805

F. V. HADLEY ET AL

HEATER

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Fig. 1.



INVENTORS
Fred V. Hadley
Robert T. Carlethy
Brown & Brown

By

ATTORNEYS.

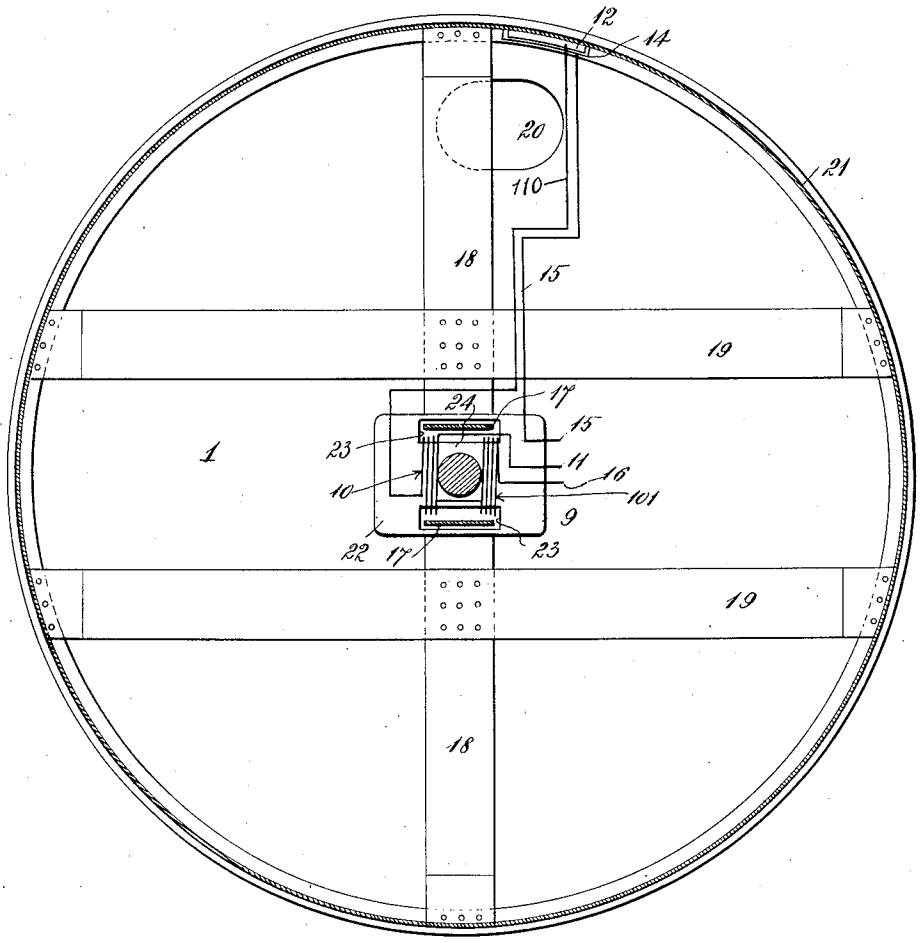
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F. V. HADLEY ET AL

HEATER

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Fig. 2.



INVENTORS
Fred V. Hadley
Robert A. Carleton
By Bowle & Hayes
ATTORNEYS.

Patented Jan. 15, 1924. 1,480,805

UNITED STATES PATENT OFFICE.

FRED V. HADLEY, OF NEEDHAM, AND ROBERT A. CARLETON, OF NEWTON, MASSACHUSETTS.

HEATER.

Application filed July 20, 1921. Serial No. 486,210.

To all whom it may concern:

Be it known that we, FRED V. HADLEY, of Needham, in the county of Norfolk and State of Massachusetts, and ROBERT A. CARLETON, of Newton, in the county of Middlesex, in said State, have invented a new and useful Improvement in Heaters, of which the following is a specification.

Our invention relates to the heating of the surface of drums, plates and the like such as the cylinders of a slasher or calenders or the like for which it is particularly fitted, and we shall describe it in connection with such a cylinder without, however, limiting ourselves to such use.

Such cylinders have heretofore usually been heated by steam or hot air. When either is used, after the shutting off of the supply of steam or hot air it takes a long time for the cylinder to cool, as the drum of which it is a part is usually so constructed that the heating fluid does not escape from the drum, but is allowed to cool therein, which is a slow process. Moreover, as steam cools it condenses and the drum is thus partially filled with hot water, which still retains for a long time a high degree of heat. Experience has shown that twelve hours and over may be necessary to cool such a drum so that it may be handled for repairs or otherwise.

Our invention comprises improved means for heating the desired surface, whether cylindrical or otherwise, by electricity, whereby its temperature may be quickly controlled, and also whereby a higher degree of temperature may be secured, if desired, than by the use of steam or hot air.

Our invention will be understood by reference to the drawings in which an embodiment is shown applied to a slasher drum.

Figure 1 is a section through the axis of the drum, the transformer being shown in elevation, and

Fig. 2 is a section on line 2—2 of Fig. 1.

1 is a drum the cylindrical portion 21 of which is made of some metal having a comparatively high resistance. The ends of this drum may be closed in by heads 2 insulated therefrom as shown or may be otherwise supported as by spokes in a well known way on the shaft 3, 4 being small reinforcing disks which serve as hubs by which the drum as a whole is attached to the shaft to turn therewith.

One end of the shaft 3 is provided with insulated collector rings 56, 57 and 58 to which current is supplied from a source (not shown) by brushes 6, 7 and 8.

9 is a transformer, the primary 101, 10 of which is connected by lead 16 to the collector ring 58. The other lead of the primary coil is connected by wire 110 with a safety device or circuit breaker 12 comprising a low fusible metal which is connected with a heat regulator 14 by the wire 13. The heat regulator may be of any thermostatic character of which there are many well known in the art. Its purpose is to break the circuit when the heat of the cylinder becomes too great. It is thus set to be operated by the heat not of the current but by the heat of the cylinder so as to prevent the overheating of the product as below described. The circuit breaker 12 is also of such a character as to break the circuit when the surface of the cylinder temperature is too great, but the temperature at which the metal will fuse is higher than that at which the thermostat will act and its purpose is to break the circuit only if the heat regulator for any reason does no act. The return circuit is by wire 15 to ring 56 and brush 6.

The wire 11 connects brush 7 and ring 57 with the primary coil 10 so that only part of the primary will be energized, the circuit being also completed through the wire 15 as before. Thus the heat of the cylinder may be regulated. If desired other divisions of the primary coil may be suitably made.

The core of the transformer comprises preferably a laminated block 22 of magnetic metal having openings 23 forming a centre column 24 through which passes the shaft 3 and around which is wound the coils 10, 101 of the primary.

The secondaries are shown at 17, the transformer being of a step-down charac-

ter. Its circuits comprise any desired number of low resistance radial bars 18, 181 which are connected to the bars 17 and are insulated from the heads 2 or other drum supports, but are electrically connected with the cylindrical portion 21 of the drum. These bars 18, 181 are connected to each other by a number of cross bars 19, 191 so that current induced in the transformer has the opportunity to reach the circumferential surface of the drum with the least possible resistance, and on reaching the circumference 21 it passes through it and bars 181 and 191 completing the circuit back to the transformer, and because of the comparatively higher resistance of the drum surface, that surface is heated to a sufficient degree to serve the purpose desired.

If too great heat is developed in the surface of the drum, the heat regulator will act to reduce the primary current, thus reducing the current that will flow through the secondary circuit, and the heating effect.

20 is a hand hole through which to get at the fuse 12 and heat regulator 13, if desired.

We have described the device as made of high resistance metal. This term, however, is comparative. It should be made of material of such resistance as will readily heat to the required temperature under the action of the current available and the construction of the transformer. And this may depend not only upon the kind of metal but upon its thickness and general construction. The bars should be of very low resistance both as to material and as to shape. Such matters being within the knowledge of those skilled in the art, need not be further described.

It will be noted that in the application of this invention as above described the material to be treated is in direct contact with the electrically heated surface. By using a low tension current, the immediate source of which may be a transformer or some other source, a plate of comparatively high resistance in cylindrical or other suitable shape in a circuit of comparatively low resistance may be used as a support for the article to be treated without danger of overheating it and hence without the need of any insulation. In using the terms "comparatively high" and "comparatively low" we mean with relation to each other. Our invention while primarily intended for use in a slasher has many other uses in mechanisms for heating and drying material, the heating surface being flat cylindrical or some other shape according to the requirements of the article to be treated.

What we claim as our invention is:—

1. The machine above described comprising a step-down transformer the secondary of which comprises comparatively low resistance elements, and a dryer having a drying portion composed of a comparatively high resistance metal, said low resistance elements being connected in circuit with said drying portion, in combination with a primary circuit comprising a heat regulator located to be heated by said dryer so that the temperature of said dryer will control the current supplied thereto.

2. A dryer adapted to support the material to be dried and comprising a hollow drum having a drying and supporting surface of comparatively high resistance metal and a step-down transformer within said drum and the secondary of which comprises comparatively low resistance elements connected in circuit with said dryer surface, in combination with a primary circuit comprising heat-regulating means located to be directly heated by said dryer and constructed whereby the temperature of said dryer will control the current supplied thereto, said transformer being located in said dryer and surrounded by an air space so that upon the breaking of the primary circuit, the dryer surface will promptly cool.

3. The machine above described comprising a drum having a surface of comparatively high resistance and a step-down transformer the secondary of which comprises comparatively low resistance members connected to the high resistance portion of said drum whereby it will be in circuit therewith, a source of current, a sectional primary and connections between said source and said primary whereby one or more sections of said primary may be brought into circuit.

4. A machine of the kind described comprising a body having a metallic surface of high resistance, a source of current, and low resistance conductors connecting said high resistance body with said source of current, in combination with means located to be operated automatically by the temperature of said metallic body whereby the amount of current passing to said body will be controlled, to control the temperature of said body.

5. In a heating mechanism, a source of electricity, a body of high resistance having a surface adapted to support an article to be heated, whereby said article may be in direct contact therewith, a current regulator receiving heat from said body, and electrical connections of low resistance between said body and said source.

6. In a heating mechanism, a source of low tension electricity, a body having a surface adapted to support in direct contact therewith an article to be heated, and electrical connections between said body and said source, the said body having a resist-

ance high in comparison with the resistance of said connections.

7. The heating mechanism above described comprising a hollow drum the peripheral part of which consists of metal having a comparatively high resistance, a source of electrical current, a step-down transformer within said drum, and connections of comparatively low resistance between the secondary of said transformer and the high resistance portion of said drum.

FRED. V. HADLEY.
ROBERT A. CARLETON.