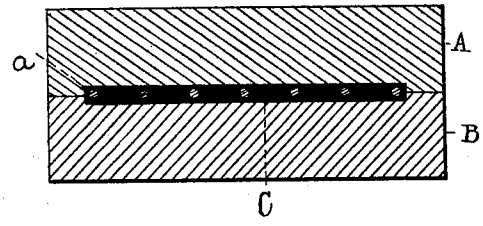
(No Model.)

H. W. LEONARD.

ELECTRIC RHEOSTAT.

No. 566,693. Patented Aug. 25, 1896.



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ELECTRIC RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 566,693, dated August 25, 1896.

Application filed May 10, 1895. Serial No. 548,807. (No model.)

To all whom it may concern:

Be it known that I, HARRY WARD LEONARD, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Improvement in Electric Rheostats, of which the following is a specification.

The object of my invention is to produce a rheostat wherein the heat developed in the conductor will be rapidly absorbed by a mass of material in close proximity to the conductor, whereby undue heating of both the conductor and the surface of the mass of material will be prevented. I accomplish this object by placing the conductor in close proximity to, and in intimate mechanical contact with, a large mass of material having a high specific capacity for heat, such as cast-iron. Such a mass of material will have a large storage capacity for heat, and will rapidly absorb the heat developed in the conductor. I have found that if one of my rheostats be in use for a few seconds only, as in the case of starting up a motor, a very small radiating-surface will answer, as the very large proportion of the heat developed is absorbed by the large mass of material without appreciably raising the surface temperature. If the mass of material and specific heat of the material in the immediate vicinity of the resistance be small, the heat developed must be dissipated by radiation, convection, and conduction through the air, and consequently the radiating-surface determines the surface temperature almost wholly, but by my invention a very large amount of energy can be developed for a short time in a rheostat having a very small radiating-surface without raising the surface temperature to a limiting degree, because the heat energy will be absorbed by the large mass of material of high specific heat, which heat will then slowly radiate during the interval of rest until the rheostat is used again.

Rheostats as heretofore made have had the least amount of material consistent with strength. It is true that frequently iron has been used in their construction, but this has been due to its cheapness as a material of suitable strength and lasting qualities, and not due to its having a high specific heat, and in no rheostat heretofore has there been used several times as much iron as required from considerations of strength and durability for the described purpose of acting as a reservoir for the storage of a large amount of energy developed intermittently for brief periods. It is of course important, as pointed out in my Patent No. 522,718, of July 10, 1894, that there be a minimum resistance to the flux of heat from the source of heat through the insulating material to the surrounding material.

My invention is illustrated in the accompanying drawing, in which—

A and B are two plates of suitable material of high specific heat, such as cast-iron, and of large mass. The insulated conductor *a* is held between these plates and in intimate mechanical contact therewith. The conductor is shown in the drawing as embedded in a layer C of insulating material, which may be a vitreous material, such as enamel, but any other suitable insulating material may be employed, and the insulated conductor may be attached in other ways to the support having a high specific capacity for heat, without departing from the spirit of my invention.

What I claim is—

1. The method of preventing undue heating in an electric conductor, which consists in absorbing a large portion of the heat energy developed in the conductor due to the passage of a current, by placing the conductor in close proximity to a large mass of material having a high specific capacity for heat.

2. The method of preventing undue heating of the surface of a rheostat, which consists in placing the conductor in immediate proximity to but insulated from a large mass of material having a high specific capacity for heat which absorbs a large portion of the heat energy developed in the conductor, substantially as set forth.

3. The method of preventing undue heating in an electric conductor which consists in absorbing a large portion of the heat energy developed in the conductor due to the passage of a current, by placing on both sides of the conductor and in close proximity thereto a large mass of material having a high specific capacity for heat.

4. The method of preventing undue heat-

ing in an electric conductor subjected to large, rapid fluctuations in current, which consists in absorbing a large portion of the heat energy developed in the conductor due to the passage of a current, by placing the conductor in close proximity to a large mass of material having a high specific capacity for heat.

5. The method of increasing the watt-dissipating capacity of the conductor of a rheostat and of preventing undue heating of the surface of the rheostat, which consists in placing the conductor of the rheostat in close proximity to a large mass of material, having high specific capacity and relatively poor conductivity for heat, and insulated therefrom by an insulating material having a minimum resistance to the flux of heat from the conductor, whereby the heat energy developed in the conductor will be rapidly absorbed by the mass of material but without greatly increasing the surface temperature thereof.

6. A motor-starting rheostat having a conductor attached to but insulated from a large mass of material having a high specific capacity for heat, which mass of material acts as a reservoir for the heat energy intermittently developed in the conductor by current passing through it, and whose surface temperature is not greatly increased by the heat energy stored therein and from which the heat energy is slowly radiated, substantially as set forth.

7. A motor-starting rheostat having a conductor attached to but insulated from a large mass of cast-iron, which mass of cast-iron acts as a reservoir for the heat energy intermittently developed in the conductor by current passing through it, and whose surface temperature is not greatly increased by the heat energy stored therein and from which the heat energy is slowly radiated, substantially as set forth.

8. In a motor-starting rheostat, a conductor placed between, and in intimate contact with but insulated from, two walls of material having a high specific capacity for heat.

This specification signed and witnessed this 1st day of May, 1895.

HARRY WARD LEONARD.

Witnesses:

W. PELZER,

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