H. W. CHENEY.

RESISTANCE UNIT FOR CONTROLLERS.

APPLICATION FILED OCT. 6, 1909.

1,094,121. Patented Apr. 21, 1914.

Fig. 1

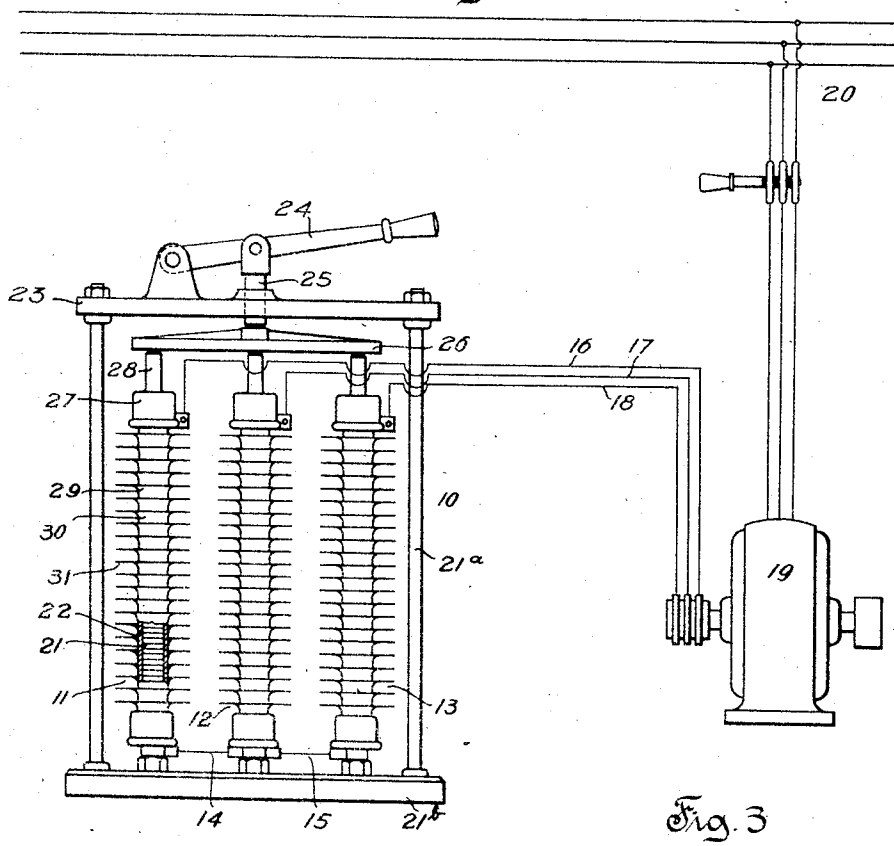


Fig. 2

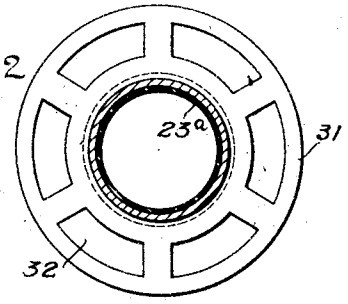
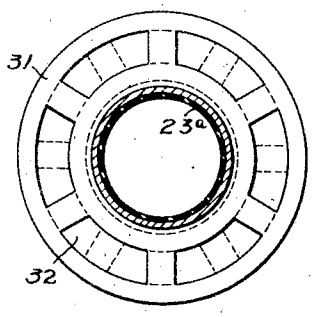


Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

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RESISTANCE UNIT FOR CONTROLLERS.

1,094,121. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed October 6, 1909. Serial No. 521,369.

To all whom it may concern:

Be it known that I, HERBERT W. CHENEY, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Resistance Units for Controllers, of which the following is a full, clear, and exact specification.

This invention relates to improvements in resistance units such as variable resistance units employed for starting or otherwise controlling the speed of dynamo-electric machines particularly motors.

More specifically the invention relates to resistance units arranged in the form of columns, such for example as columns of carbon disks or other resistance members, the effective ohmic resistance of which may be varied by varying the degree of compression between the members.

The object of the invention is to increase the radiation of heat from the resistance units of the character indicated and to provide means whereby the natural upward flow of heated air along and away from the resistance units is enhanced, so that the temperature of such units will not become excessive regardless of the amount of heat generated in the same.

In carrying out my invention I provide about the resistance unit which in use is arranged vertically or in the form of a column, a number of heat radiating flanges which may have any desired spacing longitudinally of the unit and may be formed of any desired material, preferably good heat conducting material and in these flanges I provide ventilating openings so that the formation of pockets between the flanges is avoided and there will be a free and substantially unobstructed natural flow of air upward along the resistance unit through the flanges.

My invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

For a better understanding of my invention reference is had to the accompanying sheet of drawings wherein—

Figure 1 is a partial diagrammatic view showing resistance units constructed in accordance with my invention and employed as a starting device for an induction motor. Fig. 2 is an enlarged transverse sectional view through one of the resistance units showing the ventilating openings in the flanges of the superposed heat radiating members in alinement. Fig. 3 is a similar view showing a slight modification in the arrangement of the heat radiating members, the ventilating openings in the different heat radiating members being relatively staggered.

Although I have shown in the drawings resistance units of one type only and employed for one particular purpose, it is to be understood that the invention is not limited to this type or to the particular use shown, but it may be employed with equal effect with various kinds of resistance members having flanges or other heat radiating means between which the heated air might be pocketed.

Referring now to the figures of the drawings, and first to Fig. 1, it will be seen that I have shown in this instance a resistance device 10 having three resistance units 11, 12 and 13 in the form of columns, the lower ends of which are connected together by conductors 14 and 15 and the upper ends of which are connected by conductors 16, 17 and 18 to the slip rings of an induction motor 19 which is supplied with current from conductors 20 of a three phase circuit. It will be seen that these three resistance units are connected to the slip rings in Y formation. Each of the resistance units consists in this case of a column of disks 21 of resistance material such as carbon, inclosed within a tube 22 preferably formed of good conducting material such as copper, the disks being separated from the tube by an insulating lining 23^a as shown in Figs. 2 and 3.

The three resistance units are mounted on a base 21^b forming a part of a frame which includes vertical rods 21^a and a top plate 23 supported by the rods. Pivotally mounted upon the top plate 23 is an operating lever 24 by means of which the effective ohmic resistances of the three resistance units are adapted to be simultaneously varied. This lever 24 is provided with a pivoted rod 25 which extends downward from the lever 24 through the top plate 23 and engages a suitable plate 26. The tubes are provided at their upper ends with caps 27 and extending

through these caps are plungers 28 on the upper ends of which the plate 26 rests. Thus it will be seen that by lowering the lever 24 from its normal position, the plungers 28 will be forced downward into the different tubes compressing the carbon disks 21 so as to decrease the effective resistance of the pile or column of disks in each tube. Also when the lever is raised the degree of compression between the disks is decreased and consequently the total resistance of each column of disks is increased. The conductors 14 and 15 may be connected in any suitable manner to the lowermost disks of the three columns or units, and the conductors 16, 17 and 18 may be connected in any suitable manner to the uppermost disks of the units or to the plungers 28 as desired. In the specific use of the resistance units shown in Fig. 1, to effectively bring the motor 19 up to the desired speed, the lever is gradually lowered compressing the disks and reducing the ohmic resistances of the units. When the motor is at the required speed the resistance units may be disconnected entirely from slip rings.

As shown clearly in Fig. 1, each of the resistance units is provided with a large number of heat radiating members 29 which are preferably formed from good conducting material such as copper, and each being formed with a collar or tubular portion 30 and with a substantially horizontal circular flange 31 so that these members 29 will have large surfaces exposed to the air. It is to be understood that the heat radiating members may be constructed otherwise than here shown, and any desired number may be provided on each unit depending upon the amount of heat which is generated in the unit and the degree of temperature to which it is desired that the units be subjected. As will be apparent from Fig. 1 of the drawing unless means is provided for permitting the heated air to escape from between the flanges, the latter will form pockets for the heated air and the effective heat radiation will be comparatively small inasmuch as these resistance units are vertically arranged. To avoid the pocketing of air between the flanges each of the latter is provided, as shown clearly in Figs. 2 and 3, with a number of openings 32 through which a natural flow of air will take place upward along the unit. These openings may be arranged in alinement so that the upward flow of air will be practically unobstructed, or they may, if desired, be staggered, as shown in Fig. 3, in which the relative arrangement of the openings will insure a movement of the air in a transverse direction between the flanges.

I do not desire to be confined to the exact details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent is:—

1. A resistance unit in the form of a column and comprising a plurality of resistance members, a tube inclosing said resistance members, a plurality of superposed heat radiating members spaced lengthwise of the unit and provided with flanges, said flanges having ventilating openings through which air may pass upwardly along the unit, the openings in adjacent flanges being out of alinement.

2. A resistance element having a plurality of superposed spaced disks, said disks provided with openings, the openings of different disks being in staggered relation.

3. In a heat radiating device, a plurality of superposed and spaced disks provided with openings, the openings in adjacent disks being out of alinement.

4. In a heat radiating device, a tubular element provided with a plurality of external plane flanges, said flanges being provided with openings arranged in staggered relation.

Milwaukee, Wis., Sept. 11, 1909.

In testimony whereof I affix my signature, in the presence of two witnesses.

HERBERT W. CHENEY

Witnesses:
CHAS. L. BYRON.
ROB. E. STOLL.