J. THOMSON.

TUBULAR ZIGZAG CARBON ELECTRIC RESISTER.

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1,318,030.

Patented Oct. 7, 1919.

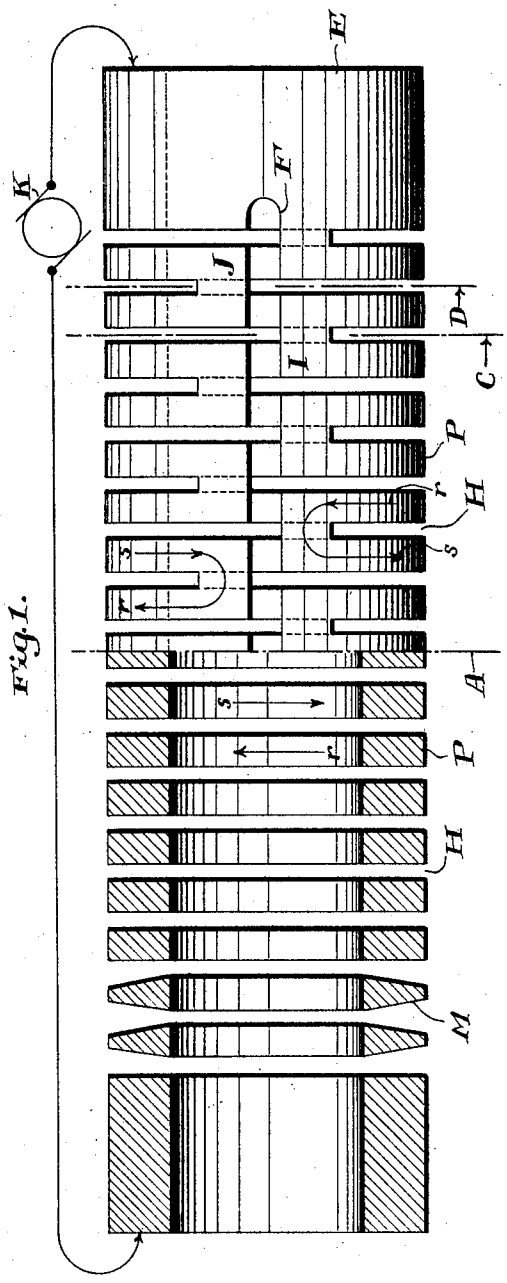


Fig. 1.

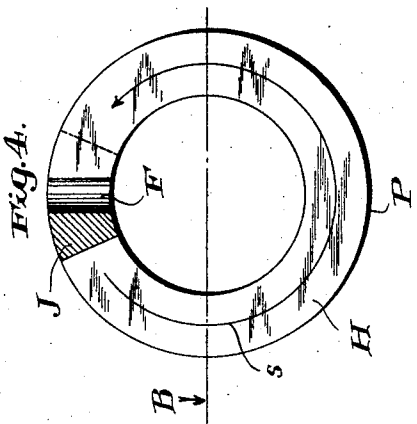


Fig. 4.

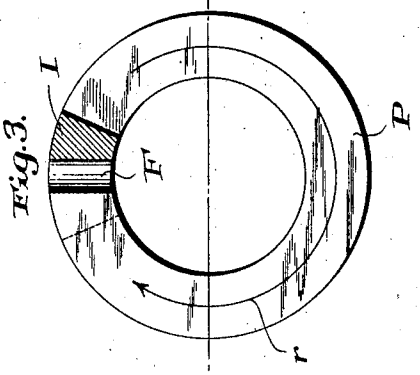


Fig. 3.

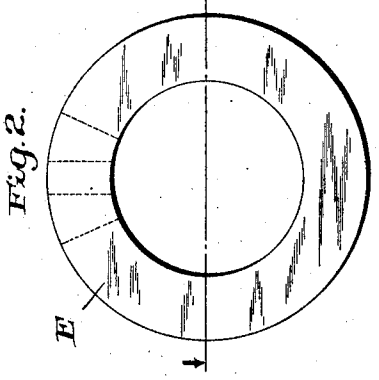


Fig. 2.

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TUBULAR ZIGZAG CARBON ELECTRIC RESISTER.

1,318,030. Specification of Letters Patent. Patented Oct. 7, 1919.

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To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, and a resident of the borough of Manhattan, city of New York, county and State of New York, have invented certain new and useful Improvements in Tubular Zigzag Carbon Electric Resisters, of which the following is a specification.

The invention relates to tubular, zig-zag, carbon, electric resisters and is particularly directed to the forming of a tubular resister construction in which the resister members are connected in series.

As illustrating a specific embodiment of the invention reference is made to the accompanying drawing forming a part of this specification and in which drawing:

Figure 1 is a composite elevation and longitudinal center section of the resister from the right and left-hand of the vertical center-line A. The right hand half of Fig. 1 shows the top of the resister when in the position indicated in Fig. 2 and the left hand half of Fig. 1 is a longitudinal section taken as on the plane indicated by the center-line B of Figs. 2, 3 and 4 looking in the direction of the arrows.

Fig. 2 is an end elevation either from the right or the left hand end of the resister.

Fig. 3 is a transverse section along a zig-zag slot, as on the plane indicated by the line in slot C; and

Fig. 4 is a transverse section along a zig-zag slot, as on the plane indicated by the line in slot D, contiguous to a coördinating slot, as C.

The resister E is formed of carbon, either graphitized or amorphous, and it is primarily molded as a cylindrical tube or a solid round rod, but in the latter case it is bored to produce a cylinder.

The ensuing constructive steps are to cut a longitudinal slot, F, through the tubular wall, which preferably does not extend to the ends, and then mill a series of transverse slits, H, leaving connecting sections as I and J, each of which is staggered from the other on opposite sides of the said slot F. In this wise, a "zig-zag" electric circuit, of restricted area, is formed between the terminals.

When the resister is suitably set to be electrically incited, which is here symbolically denoted by K, the current passes in a circular path, right and left, from one connecting section to another, around the circular limbs P, as denoted by the arrows *r s* of Figs. 1, 3 and 4.

It is to be observed that, owing to the circular traverse of the current as it passes from one limb to another, an extensive lineal length of circuit may be obtained in a comparatively short resister.

When the sides of the limbs are parallel to each other, producing a rectangular cross-section, and as the lineal length of the inner circumference of the resister is manifestly less than that of its outer circumference, the current-density will be proportionately increased along the inner surface of the bore. This condition may be usefully availed of in cases where the thermal effect is to be employed within the bore. When, however, the transfer of heat is outwardly from the peripheral surface, the slits may be tapered, thereby producing a wedge-like cross-section, such as denoted by M, Fig. 1. In this wise, by a proper proportionment of the wedge, whereby to obtain the greater mass thereof along the bore, this serves to counter-balance its lesser circumferential length and the current-density, between the inside and the outside, will then be approximately uniform, as in the instance of a straight rod.

This type of resister is readily machined from standard sizes of carbon rods or bars and it is peculiarly effective in cases where a very uniform transfer and dispersion of heat is desirable in directions converging toward the axial center or diverging radially from the outside.

What I claim is:

1. A tubular, zig-zag, carbon, electric resister having circular limbs which pass from and to correlative connecting sections and also having a longitudinal slot separating the said sections, whereby the transmission of electric current is in series through both the limbs and the connecting sections.

2. A tubular, zig-zag, carbon, electric resister having circular limbs which pass from and to correlative connecting sections, the cross-sectional contour of said limbs being such as to produce an approximately uniform current-density throughout the mass.

3. A tubular, zig-zag, carbon, electric resister made by forming a longitudinal slot in a wall of a tubular blank, which slot extends radially through the wall for a large

part of the length of the wall, and thereafter milling or otherwise forming alternating transverse slots, each of which transverse slots extends through the material at one side of the longitudinal slot and also extends adjacent to but not through the material defining the other side of the longitudinal slot, the resulting construction being such that the several slots are defined by members which are electrically connected in series.

This specification signed and witnessed this 10th day of September, A. D. 1918.

JOHN THOMSON.

Signed in the presence of—
JOSEPH KASTNER, Jr.,
RALPH M. THOMSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."