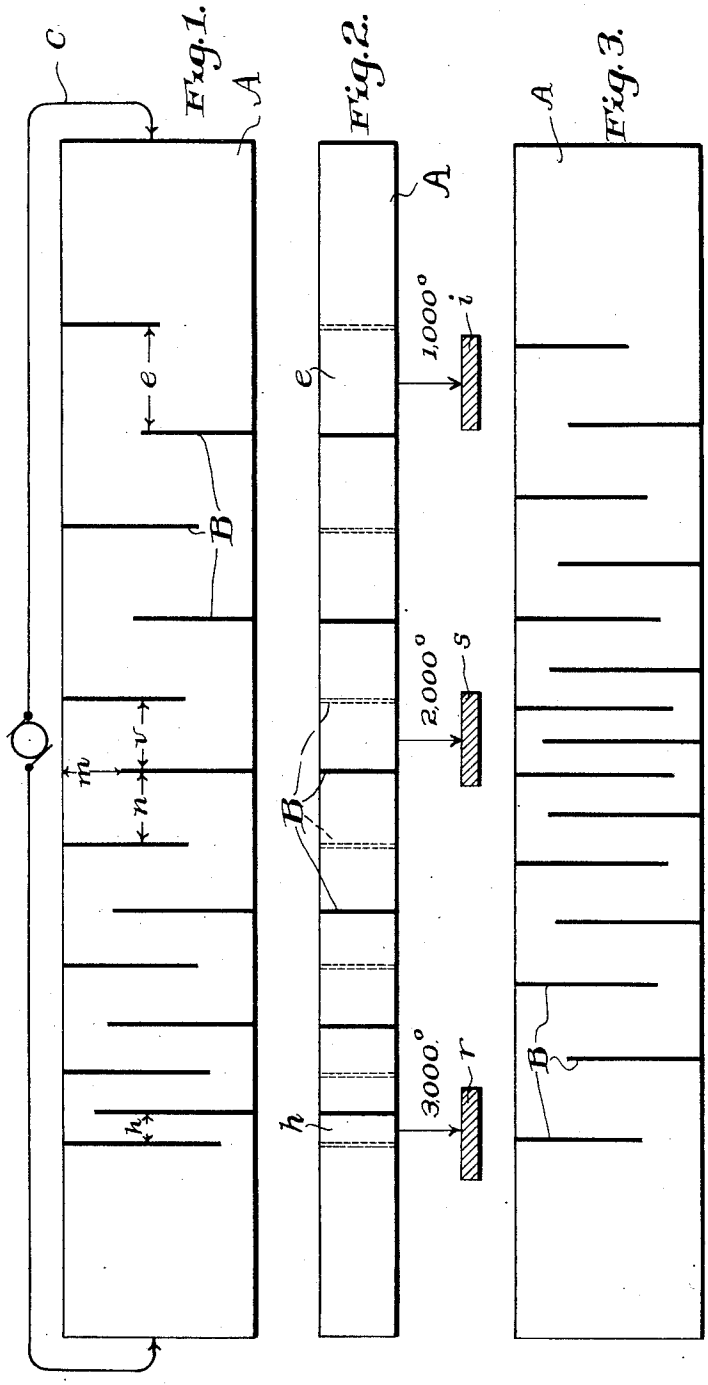
J. THOMSON.

ZIGZAG CARBON ELECTRIC RESISTER.

APPLICATION FILED OCT. 7, 1918.

1,318,028. Patented Oct. 7, 1919.



INVENTOR

John Thomson

BY

Kidder & Thompson

HIS ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF NEW YORK, N. Y.

ZIGZAG CARBON ELECTRIC RESISTER.

1,318,028. Specification of Letters Patent. Patented Oct. 7, 1919.

Application filed October 7, 1918. Serial No. 257,214.

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 Zigzag Carbon Electric Resisters, of which the following is a specification.

This is an invention in electric, carbon, zig-zag resisters, for use in furnaces, the controlling objects of which are, firstly, to so dispose the alternating slots that a portion, or portions, of the resister may be maintained at a higher, or lower, temperature than another portion, or portions; and secondly, to effect, in a carbon body of given dimensions, a greater lineal length of restricted circuit than has hitherto been realized.

In the drawings,

Figure 1 shows a resister in plan;

Fig. 2 is a side elevation thereof; and

Fig. 3 is a view similar to Fig. 1 but denoting a modification in its construction.

Conditions have arisen in practice where it was found desirable to cause a resister to impart a progressively rising temperature to the object, or objects, to be heated, and this has been accomplished by the simple expedient of employing an amorphous or graphitized carbon slab or rod having a zig-zag circuit produced by slots whose spacing progressively increases from one transverse zone to another. In this wise, the current-density progressively increases or decreases, as from right hand to left hand or vice versa, with a corresponding flow of heat therefrom.

In Figs. 1 and 2, the carbon slab, A, of rectangular cross-section, has a plurality of staggered slots, B, which produce the zig-zag circuit, whose spacing progressively increases and the transverse depth of which progressively decreases, that is as viewed from the left hand end to the right hand end. When such a resister is energized, as empirically denoted by the power-circuit, C, the resistance and current-density are inversely proportional to the cross-sectional areas of the various limbs formed by the slots. For example, if the space *e* is three times the width of the space *h*, then the temperatures developed would be in about the ratio shown in Fig. 2. Consequently, were it desirable to heat three different objects as *r*, *s*, *i* to three relatively distinct temperatures, this result can be attained. Again, if the object *i* is introduced into a furnace chamber at atmospheric temperature and is withdrawn at *r* when heated to, say, 1500° the withdrawal of heat from the resister is more uniformly distributed than if its entire mass were at the maximum temperature, 3,000°, noted on the drawing.

Among the cases where this resister is particularly effective are, say, fractional distillation of fumable metals and heating steel, as for forging or preparatory to rolling. It goes without saying, that when a mass of cold metal is placed in close proximity to a highly heated resister, the difference of temperature may be so great as to cause an exceedingly rapid flow of heat from the hotter to the colder body, to such an extent, in fact, as might impose detrimental physical stresses upon the coördinating members.

The object of progressively increasing, or decreasing, the transverse depth of the slots is to maintain a cross-sectional area between the end of any given slot and the contiguous side of the resister, as *m*, Fig. 1, which shall approximately correspond with that of either of the two connected limbs, as *n*, *v*.

The progressive spacing of the slots may also be from the center of a slab toward either or both of its ends, as is shown in Fig. 3, or in any manner of disposal or ratio of progression which may best accomplish the desired result.

It will be manifest that instead of cutting straight slots, they might be curved or sinuous, and instead of entering the sides of the slab vertically they may also be here formed at an angle thereto.

What I claim is:

1. An electric, carbon zig-zag resister in which the spacing of its slots is progressively increased, or decreased, from one transverse zone to another.

2. An electric, carbon zig-zag resister in which the depth of its slots is progressively increased, or decreased, from one transverse zone to another.

3. An electric, carbon zig-zag resister in which the spacing of its slots is progres-

sively increased and the depth of said slots is progressively decreased, or vice versa, from one transverse zone to another.

4. A zig-zag resister in which the spacing of its slots progressively increases or decreases from or in the proximity of one end to the other thereof.

This specification signed and witnessed this 13th day of September, A. D. 1918.

JOHN THOMSON.

Signed in the presence of—
RALPH M. THOMSON,
H. O. WEED.