

May 15, 1934.

G. R. FRYLING

1,959,285

RESISTOR

Filed March 7, 1931

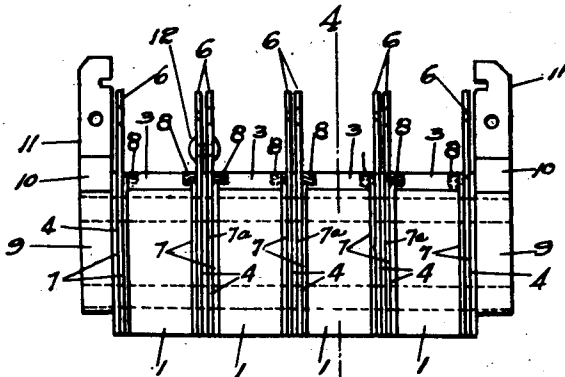
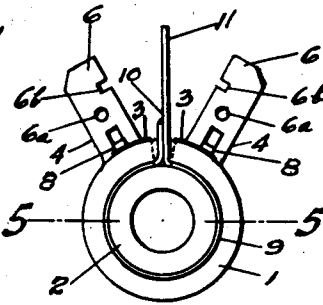


FIG. 2

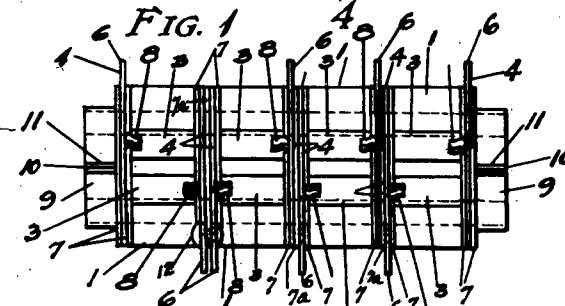
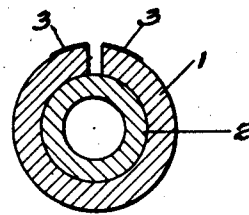


FIG. 4

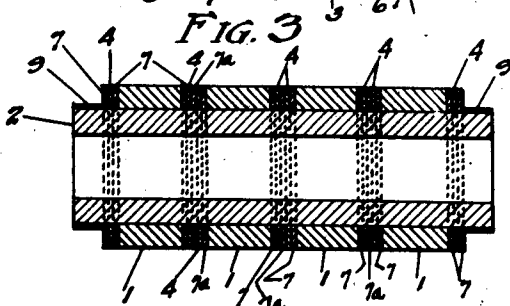
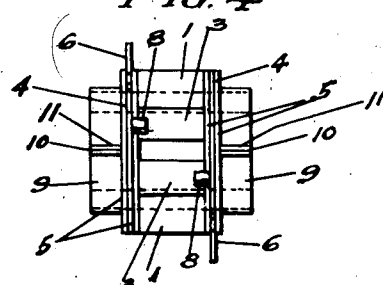
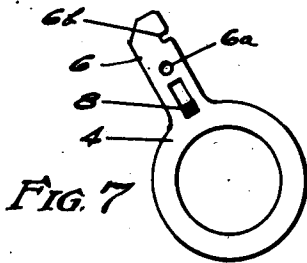
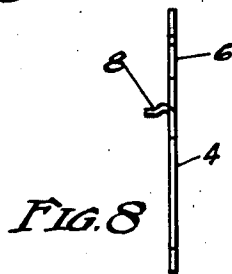


FIG. 6

FIG. 5



George R. Fryling
INVENTOR.

BY W. L. L. L.
ATTORNEYS.

UNITED STATES PATENT OFFICE

1,959,285

RESISTOR

George R. Fryling, Erie, Pa., assignor to Erie Resistor Corporation, Erie, Pa., a corporation of Pennsylvania

Application March 7, 1931, Serial No. 520,943

13 Claims. (Cl. 201—75)

The present invention is designed to simplify the construction of resistors, to make them more readily available, and to so form them as to provide for an increased capacity in a small space.

5 In carrying out my invention I utilize resistor units in the form of split rings and apply the connections at the ends of the rings so as to provide a circumferential path for current through the resistor. Thus the length of this path is very
10 much extended in a very short space. I also contemplate the assembly of a plurality of these units in axial alinement with the connections so applied that each unit may form an individual resistor, or may operate so that a series of the
15 resistors operate in parallel, or so connect the several units that they operate in series. Preferably in series the direction of current is reversed. Features and details of the invention will appear from the specification and claims.

20 A preferred embodiment of the invention is illustrated in the accompanying drawing as follows:—

Fig. 1 is a side elevation of the resistor including a plurality of units.

25 Fig. 2 an end elevation of the same.

Fig. 3 a plan view of the same.

Fig. 4 a section on the line 4—4 in Fig. 1.

Fig. 5 a section on the line 5—5 in Fig. 2.

Fig. 6 a resistor involving a single resistor unit.

30 Fig. 7 a side view of one of the connector plates.

Fig. 8 an edge view of one of the connector plates.

The resistor units 1 are formed of molded carbon resistor composition in the form of split rings, these rings being mounted on an insulating rod
35 2 of porcelain, or the like. The units have the metallic connector coating 3 at their ends, preferably a copper plating. The resistor composition consists of the usual comminuted current responsive material, as carbon, more or less dispersed with an electrically inert comminuted material united by a binder.

Connector plates 4 are arranged at each side of the resistor units 1. These plates are of disc
45 form corresponding to the resistor itself, and are insulated from the units by insulating discs 5. The plates have the take-off extensions 6 with perforations 6a and notches 6b by means of which conductors may be connected to the plates. The
50 plates have fingers 8 which extend over and form electric connections with the contact surfaces 3. The plate at one side of the resistor unit 1 has the contact finger at one end of the ring and the plate at the opposite side has the contact finger
55 at the opposite end of the ring. Thus the cur-

rent from the connector passes through the finger circumferentially through the resistance and off the opposite end through the finger and connector plate.

The resistor ring may be formed in a single unit, as shown in Fig. 4, and is secured on the rod 2 by a strap 9 extending around the rod and abutting an insulating disc 7a outside the plate. The strap is secured together at 10 and has an extension 11 by means of which the resistor may
65 be supported.

In some instances it is desirable to mount a number of resistors on a single rod for convenience. In this case the plates at each side of each unit are insulated from the resistor by the insulating discs 7 and the adjacent connector plates are insulated from each other by the resistor discs 7a. The plates may be arranged with the extensions 6 staggered, as indicated in Fig. 2, so that the conductors leading to each of the resistances may be readily attached. The current in adjacent resistors may be reversed so as to avoid induction. In case it is desired to interpose a greater resistance, the resistance units may be readily arranged in series. Under these conditions, the contact plates on adjacent units place the fingers on similarly directed ends of the resistor units and the extensions are secured together by rivets, or screws 12, the two units at the left of Figs. 1 and 3 showing this manner
75 of connection. The current, therefore, passes through the second unit from the left by way of the connector plates to the first unit toward the left and then around the first unit at the left and out at its connector plate. Thus these two units operate in series and present the extended resistance of two of the units.

It will be seen, therefore, that the resistor, as shown in Fig. 4, may be associated with other similar units with a single mounting, thus simplifying the mounting and bringing the resistors into a small space and these resistors may be used individually, or may be used in series, as desired, the device giving complete flexibility in this respect. The ring formation also presents a large cooling surface, thus giving a larger wattage rating than is given to solid molded units of the same size in that the increased surface area allows of greater heat dissipation.

In some instances a resistance less than I have provided by any of the units is desirable. In this case a single conductor may be connected through two resistor rings in parallel, thus reducing the resistance as desired.

While I have shown the resistor element mem- 110

bers as practically complete rings, I do not wish to be limited to as nearly a complete annulus as shown.

What I claim as new is:—

5 1. A resistor comprising a plurality of individual split rings of resistance material; connector plates at the sides of each ring; insulating members between the plates and the rings; connections between the plates and the rings, said connections being off-set circumferentially on each
10 ring giving a circumferential path through the ring; a securing rod extending through the rings; end pieces on the rod securing the plates; and projections from the end pieces forming a means
15 of support for the resistor.

2. A resistor comprising a split ring of resistance material; arcuate connector plates at the sides of the ring the opposing faces of the plates and ring being in parallel planes having contact
20 fingers extending therefrom engaging the outer periphery of the ring; and insulating members between the connector plates and the ring.

3. A resistor having a plurality of individual split rings of resistance material in axial alignment; insulating members at the sides of the
25 rings and separating the rings; and connections between parts of the rings providing a circumferential current path in the rings.

4. A resistor having a plurality of individual rings of resistance material in axial alignment, said rings being split forming ends at the sides of the severance; insulating members at the sides
30 of the rings and separating the rings; and connections between parts of the rings providing a circumferential current path in the rings, said connections being between parts of rings at the same side of the severance of each ring providing
35 a reverse direction to the current in the connected rings.

5. A resistor device comprising a plurality of individual split rings of resistance material in axial alignment; insulating members at each
40 side of each ring and separating the rings; pairs of connector plates for each ring with one plate at each side of each ring connected with the interposed ring to provide circumferential current
45 paths through the rings; and means including a securing rod extending through the rings for securing the rings in assembly.

6. A resistor device comprising a plurality of individual split rings of resistance material in axial alignment; insulating members at the sides
50 of the rings and separating the rings; pairs of connector plates for each ring with one plate at each side of each ring connected with the interposed ring to provide circumferential current
55 paths through the rings; and means including a securing rod extending through the rings for securing the rings in assembly, some of the connector plates being connected placing the rings
60 in series.

7. A resistor device comprising a plurality of individual split rings of resistance material in axial alignment; insulating members at the sides
65 of the rings and separating the rings; pairs of connector plates for each ring with one plate at each side of each ring connected with the interposed ring to provide circumferential current

paths through the rings; and means including a securing rod extending through the rings for securing the rings in assembly, some of the connector plates connected with adjacent rings being
80 connected with said adjacent rings at the same sides of the separations formed by the splits in the rings placing the rings in series with the direction of current in adjacent parts of the rings in reverse directions.

8. A resistor device having a plurality of split rings of resistance material in axial alignment; connector plates at each side of each ring; insulating members between the inner plates and the rings and between the connector plates, each
85 connector plate having a ring portion with an extension therefrom; and means for connecting each plate with a resistor ring, said extensions being adapted for take-offs, or connections between the connector plates whereby the device
90 may be used with individual resistor rings, or with separate rings in series.

9. A resistor comprising a split ring of resistance material; a connector plate at one side of the ring; an insulating member between the plate and the ring, said ring, connector plate and insulating member having coextensive engaging
100 surfaces extending in parallel planes; a connection between the plate and ring; and a second connection on the ring off-set circumferentially from the connection between the ring and plate
105 giving a circumferential current path through the ring.

10. A resistor device comprising a plurality of individual split rings of resistance material in axial alignment; connector plates at the sides
110 of some of said rings; connections between the rings providing circumferential paths through the rings; and insulated securing means including insulating members between the plates and the rings, said means securing the rings in assembly.

11. A resistor device comprising a plurality of resistor units, each in the form of an insulated separate split ring of molded composition; a support securing the units in axial assembly;
120 and connections to and from the rings forming a circumferential current path in the rings.

12. A resistor comprising a split ring of resistance material; arcuate connector plates at the sides of the ring the opposing faces of the plates and ring being in parallel planes; insulating
125 members between the plates and the ring; and connections between the plates and the ring, said connections being off-set circumferentially giving a circumferential current path through
130 the ring.

13. A resistor comprising a split ring of resistance material; arcuate connector plates at the sides of the ring the opposing faces of the plates being in parallel planes; insulating members between the plates and the ring; connections between the plates and the ring, said connections being off-set circumferentially giving a circumferential path through the ring; and an insulated
135 rod extending through the ring and plates and on which the ring and plates are mounted.

GEORGE R. FRYLING.