

Dec. 29, 1942.

A. H. SCHAFER

2,306,504

WOVEN WIRE RESISTANCE

Original Filed April 17, 1940

FIG. 1

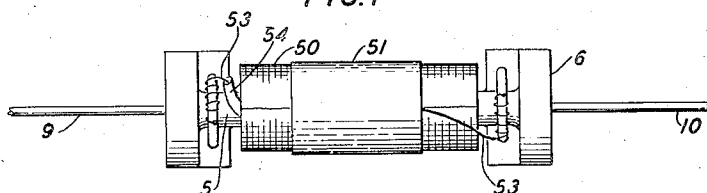


FIG. 2

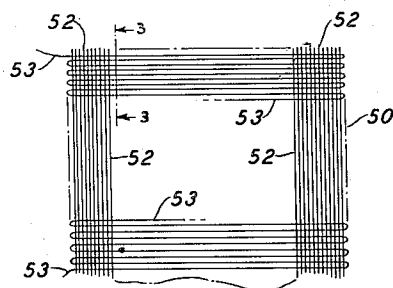
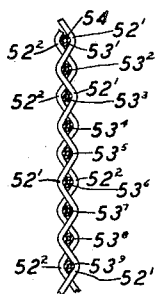


FIG. 3



INVENTOR
A. H. SCHAFER
BY J. MacDonald
ATTORNEY

UNITED STATES PATENT OFFICE

2,306,504

WOVEN WIRE RESISTANCE

Arthur H. Schafer, Flushing, N. Y., assignor to
Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Original application April 17, 1940, Serial No.
330,024. Divided and this application September
19, 1941, Serial No. 411,454

2 Claims. (Cl. 201—63)

This invention relates to electrical resistance devices and, more particularly, to resistance devices comprising a woven wire type resistance element and a support therefor.

The object of the invention is to provide a woven wire type resistance which has very low inductance and capacitance characteristics.

The woven wire type resistance may be mounted on a support of the type shown and covered in my application Serial No. 330,024, filed April 17, 1940, and as shown in Fig. 11 of that application. The present application is a division of my application Serial No. 330,024, filed April 17, 1940, entitled Resistance device, which issued as Patent 2,278,045, March 31, 1942.

In the drawing:

Fig. 1 shows a woven wire resistance element mounted on a support and corresponds to the illustration of the device shown in Fig. 11 of my former application above identified;

Fig. 2 is an enlarged plan view of a portion of the woven wire resistance element; and

Fig. 3 is a side view in section taken on the line 3—3 of Fig. 2 and greatly enlarged relative to Fig. 2.

The woven wire type resistance element 50 comprises a warp of threads of insulating material and a woof of resistance wire. The form of weave is such that the resistance element has very low inductance and distributed capacitance characteristics. The low inductance characteristic is attained by keeping the picks of wire in the woof in a common plane and having each thread of the warp take a zigzag form to accommodate the picks of wire in the woof without deflecting the picks of wire from the common plane. As shown in Fig. 2 the resistance element 50 comprises a warp of thread 52 and a woof of resistance wire 53, the resistance wire 53 being woven back and forth through the warp in a series of picks each pick being a single straight run of the wire 53 through the warp threads 52. It will be understood that the central portion shown in Fig. 2 as being clear of any warp threads or runs of resistance wire is in practice filled with the warp threads and resistance wire in the same manner as the corner portions of the figure and that the portions shown in the figure as being devoid of either warp threads or resistance wire contain the missing warp threads or resistance wire as the case may be and follow the construction of the corner portions of the figure. The resistance wire 53 may be bare of insulating coating or may be covered with an insulating material according to the character of resistance

element required or the requirements of the service in which it is to be used.

Fig. 3 shows a cross section of a portion of the woven resistance element, the section being taken on the line 3—3 in the direction of the arrows shown in Fig. 2 and greatly enlarged relative to that portion of Fig. 2. Fig. 3 shows two of the warp threads 52 identified as 52' and 52" and nine picks of the resistance wire 53 identified as 53' to 53". The resistance wire is shown in Fig. 3 as having an insulating covering 54. It will be seen by looking at Fig. 3 that the picks 53' to 53" are arranged in a common vertical plane and are not deflected from this plane by the warp threads 52' and 52" but that the warp threads take a zigzag course through the picks of the woof, the warp threads being alternately deflected to pass from one side of a pick of the resistance wire to the opposite side of the next pick. In the form of weave shown, no warp thread is cooperatively encircled by two adjacent picks of the woof of resistance wire. This woven resistance element is therefore free of the inductive characteristics inherent in woven wire types of resistance elements in which a warp thread is cooperatively encircled by two adjacent picks of the resistance wire and becomes, in effect, the core of an inductive solenoid.

As shown in Fig. 1, the woven wire resistance element 50 is wound on the barrel portion 5 of a spool-type support 6. A holding ring 51 of adhesive tape or other suitable material extends around an outer portion of the resistance element 50 to prevent unwrapping of the resistance element from the support. One end of the resistance wire 53 in the resistance element 50 is connected to the terminal 9. This end is shown as being the inner end of the resistance element 50 and may be provided with a sleeve 54 of insulating material to insulatingly protect the wire 53 at the point of its passage from the woven resistance element 50 to the terminal 9. The other end of the wire 53 which may also be provided with insulating sleeving is the outer end of the resistance element 50 and is electrically connected to the terminal 10. The electrical connections of the wire 53 to the terminals may be made in the manner and form described in my previous application above identified. The structure shown in Fig. 1 may be provided with an insulating coating or be encased in a tubular casing, not shown in the figure.

What is claimed is:

1. A woven wire type resistance element comprising a warp of threads of insulating mate-

rial and a woof of electrical resistance wire, the woof comprising a plurality of parallel picks of the resistance wire maintained in a common plane and the warp comprising a plurality of insulating threads alternately deflected in zigzag form from the common plane of the picks of the woof and running in woven form through the woof without deflecting the picks of wire from their common plane, the arrangement of the resistance wire relative to the threads of the warp being therefore such that no warp thread is encompassed by turns of said resistance wire in the manner of a core of a solenoid and is not affected in the manner of a core of a solenoid when current is passing through said resistance wire.

2. A woven wire type resistance element comprising a warp of threads of insulating material

and a woof of electrical resistance wire the picks of the woof extending back and forth across the warp in a normal and regular form of weave and maintained in a common plane and the threads of the warp being alternately deflected from the common plane of the picks of the woof to accommodate the picks of the woof and so that no warp thread is at any point, in effect, cooperatively encircled by two adjacent picks of the wire in the woof, the arrangement of the resistance wire relative to the threads of the warp being therefore such that when current is passing through said resistance wire the threads of the warp are not affected at any point in the manner of a core of a solenoid.

ARTHUR H. SCHAFER.