Aug. 16, 1938. J. G. SOLA 2,127,237

REACTOR

Filed July 13, 1936

Fig. 1.

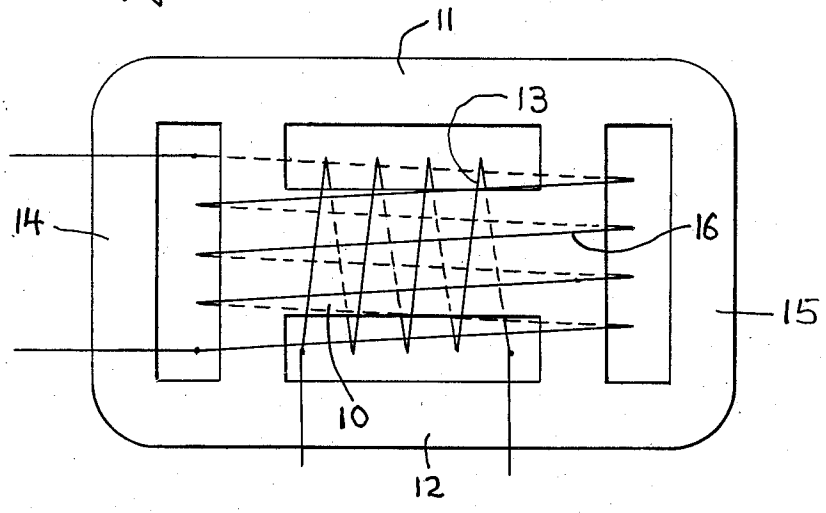
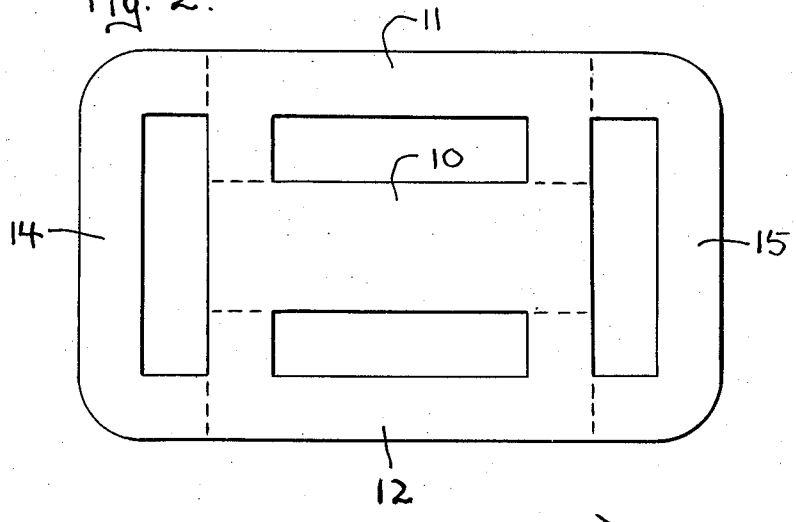


Fig. 2.



Inventor,
Joseph G. Sola,
By Fricke & DeRusk
Attorneys.

Patented Aug. 16, 1938 2,127,237

UNITED STATES PATENT OFFICE

2,127,237

REACTOR

Joseph G. Sola, Oak Park, Ill., assignor to Sola Electric Co., Chicago, Ill., a corporation of Delaware

Application July 13, 1936, Serial No. 90,366

2 Claims. (Cl. 171—242)

My invention relates to reactors adapted for use in series in a circuit connected with a source of alternating current for controlling and varying the flow of alternating current through the circuit, and it has for its object the provision of a new and improved form and arrangement of parts in a device of this type whereby improved results may be attained. It is one of the objects of my invention to provide an improved inter-relationship of parts whereby the controlling means shall have a maximum effect upon the reactance coil element while at the same time the reactance coil element shall have a minimum effect upon the controlling means, so as to enable me to effect the desired control by the use of a current of very small magnitude as compared with the magnitude of the maximum current flowing through the reactance coil.

It is another object of my invention to improve devices of this type in sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects are illustrated in the drawing and are hereinafter specifically described. That which I believe to be new and desire to cover by Letters Patent is set forth in the claims.

In the drawing,—

Fig. 1 is a diagrammatic view showing the preferred form of my improved reactor; and

Fig. 2 is a face view of the magnetic core as employed in connection with the device of Fig. 1.

Referring now to the drawing and referring particularly to Fig. 2, 10 indicates a core bar with its ends joined at opposite sides by auxiliary core means in the form of yokes 11 and 12 so as to form with the bar 10 a double loop arrangement for enclosing a coil 13, as is shown in Fig. 1. Other core means in the form of yokes 14 and 15 are provided across the ends of the core bar 10 in spaced relation with said core bar forming two additional loops each having portions in common with said first named two loops, a coil 16 being mounted on said core bar 10 at right angles to said first named coil 13. In Fig. 2 the several parts of the core means comprising the core bar and the several yokes are separated from each other by dotted lines for convenience of designation. It is to be understood that the parts will have any desired form for effecting the required connection of the parts in accordance with well understood principles of core formation.

In the preferred form of arrangement, as shown in the drawing, the yoke portions 11 and 12 are of uniform cross sectional size throughout their length, being just half as large as the core bar 10. In like manner the yokes 14 and 15 are of uniform cross sectional size throughout corresponding to the size of the yokes 11 and 12.

The coil 13 is designed to be formed of a comparatively large number of turns of small wire adapted by the influence of a comparatively small direct current therethrough to produce a high degree of flux density up to effective saturation in the bar 10 and the yoke portions 11 and 12. The coil 16 on the other hand is formed of a comparatively much smaller number of turns of heavier wire so as to be adapted to permit an alternating current of the desired maximum strength to flow therethrough when the density of the flux is high in the bar 10 by the influence of the direct current in the coil 13, and so as to be adapted to permit only a greatly restricted flow of alternating current therethrough by reason of the greatly increased reactance effect therein when the flux in the bar 10 is substantially cut down upon a reduction in the direct current flow through the coil 13. The number of turns in the coil 16 is such in the arrangement shown that the reactance effect therein is sufficient for preventing any substantial flow of alternating current through said coil when the direct current is cut off completely from the coil 13. This high degree of control of the flow of alternating current through the coil 16 by a variation of the flow of direct current through the coil 13 is attained by reason of the fact that there are no return path means provided in connection with the coil 16 which are effective independently of the core parts which are common to said return path means for the coil 16 and the return path means for the coil 13, and that such core parts common to the return path means for both coils are of such size that they are capable of being substantially saturated by the influence of the direct current through the coil 13.

By the use of my improved arrangement, I am enabled by a variation of the strength of direct current through the coil 13 to control the flow of alternating current through the coil 16. I have found in practice that by the use of my improved arrangement as illustrated a comparatively small direct current through the coil 13 is sufficient for producing conditions whereby the desired maximum flow of alternating current is produced through the coil 16. As will be readily understood, by a variation of the strength of current through the coil 13, resulting in a variation in the degree of partial saturation in the core, the current through the coil 16 can be limited to the particular strength desired down to a very small

current through said coil 16 when the coil 13 is completely deenergized.

By the use of my improved arrangement as described, the winding leg portion of the bar 10 upon which the coil 13 is mounted is located effectively out of the zone of magnetization effect of the current through the coil 16. This is of great importance to the practical operation of my improved device. If the coil 13 were in inductive relation to the coil 16, then an exceedingly high voltage would be established through the coil 13 upon the passage of alternating current through the coil 16 and the coil 13 would be destroyed. By the use of my improved combination including the several elements of interrelationship as above described, I am enabled to control very readily the flow of alternating current through the coil 16 by the use of cooperating mechanism very inexpensively provided, the desired result being attained by the use of a small degree of power.

While I prefer to employ the form and arrangement of parts as shown in my drawing and as above described, it is to be understood that my invention is not limited thereto except so far as the narrower claims may be so limited in terms, it being understood that changes might well be made in the form and arrangement of parts without departing from my invention.

I claim:—

1. In a reactor, the combination of a core bar, a coil on said core bar, two core parts connecting the ends of said core bar about said coil at opposite sides of the bar forming with the bar a double loop return path for the flux established by said coil, two other core parts connected with said double loop across the ends respectively of said core bar in spaced relation to said bar forming two additional loops each having portions in common with said first named two loops respectively, and a second coil mounted on said first named core bar at right angles to said first named coil so as to have a magnetization effect on said two additional loops but so as to leave the winding leg upon which said first named coil is mounted out of the zone of magnetization effect of said second coil.

2. In a reactor, the combination of a core bar, a coil on said core bar, two core parts in the form of yokes of substantially half as great cross sectional size as that of the first named core bar connecting the ends of said core bar about said coil at opposite sides respectively of the bar and forming with the bar a double loop return path for the flux established by said coil, two other core parts also in the form of yokes of substantially half as great cross sectional size as that of the first named core bar connected with said double loop across the ends respectively of said core bar in spaced relation to said bar forming with said bar and said first named loops two additional loops having portions in common with said first named two loops respectively, and a second coil mounted on said first named core bar at right angles to said first named coil so as to have a magnetization effect on said two additional core loops but so as to leave the winding leg upon which said first named coil is mounted out of the zone of magnetization effect of said second coil.

JOSEPH G. SOLA.