

July 29, 1969

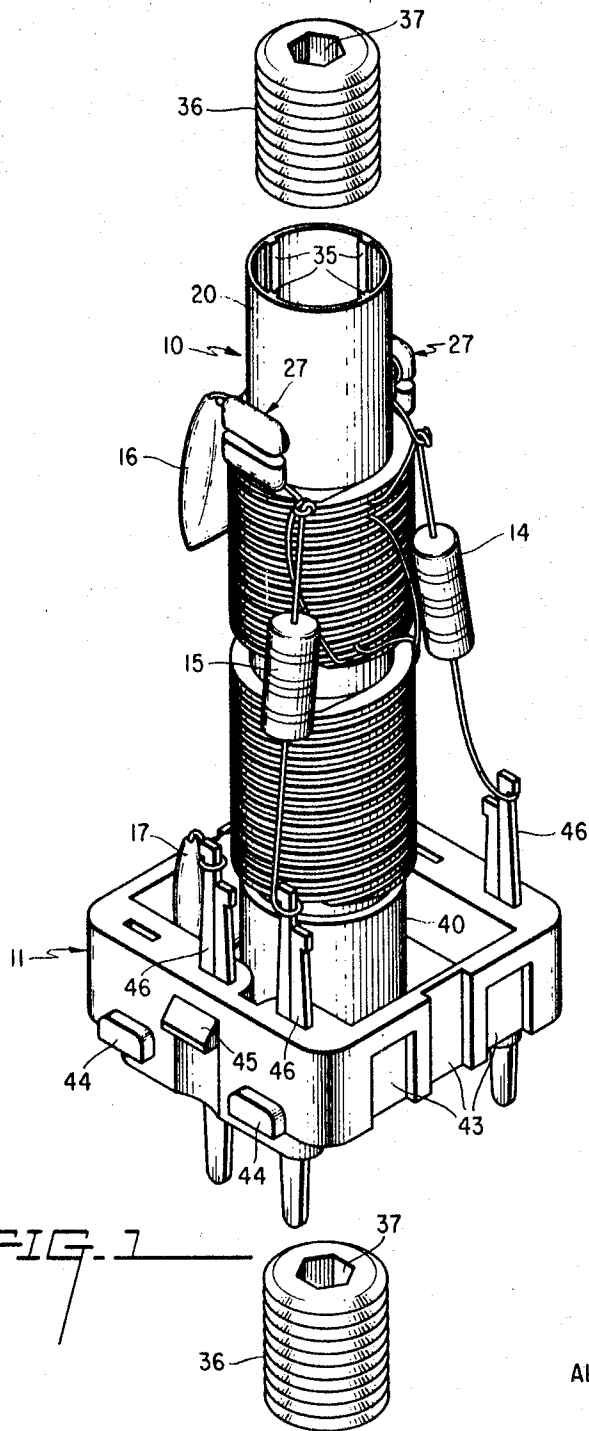
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3,458,844

COIL BOBBIN

Filed May 6, 1968

2 Sheets-Sheet 1



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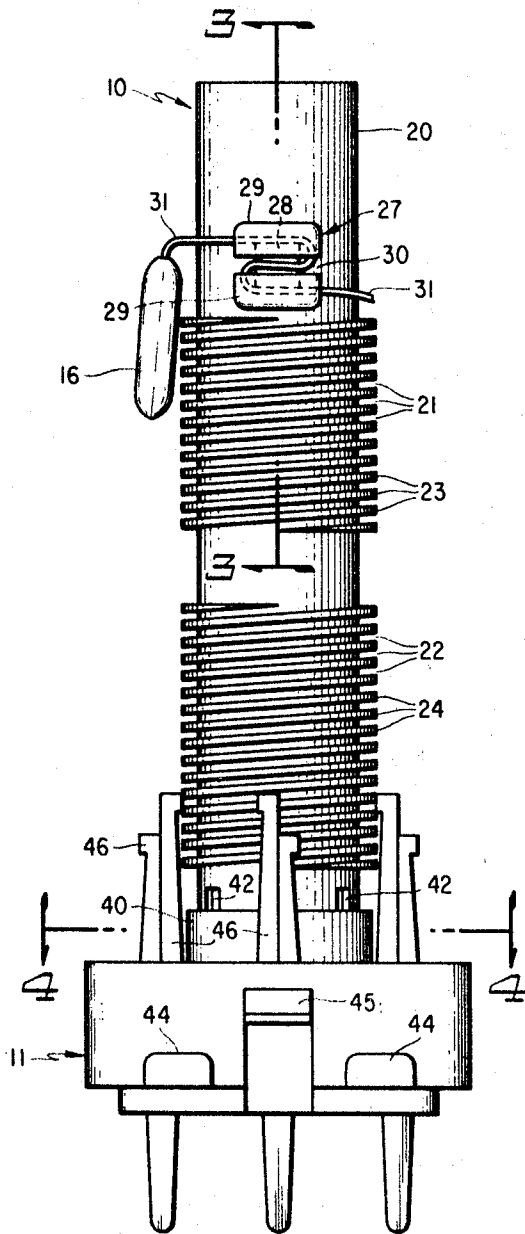


FIG. 2

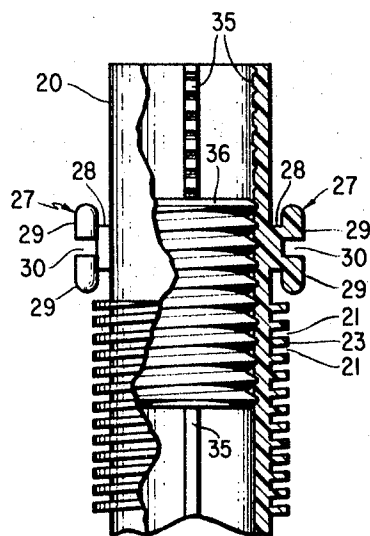


FIG. 3

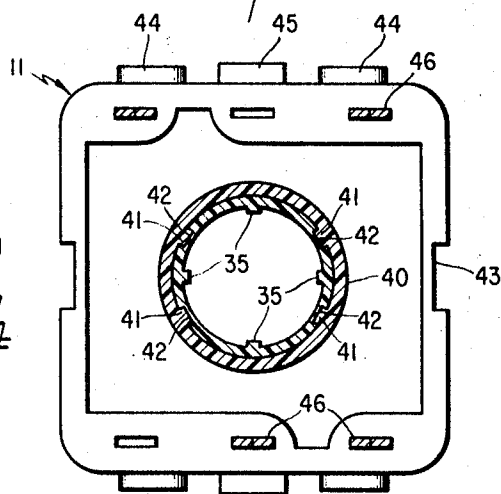


FIG. 4

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3,458,844

COIL BOBBIN

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5 Claims

ABSTRACT OF THE DISCLOSURE

A cylindrical, plastic coil form is provided with external, spiral grooves for receiving coil turns. Each of the grooves is separated from adjacent grooves by walls which can be melted to hold the coil turns in position. The coil form is hollow, and is provided with internal, longitudinal ribs which can be threaded by inserting and turning a tuning slug with external threads. The coil form is provided with anchor posts for receiving and holding wire leads. The coil form has external longitudinal grooves at one end for mating in a base that holds the coil form.

Background of the invention

My invention relates to an improved coil form, and particularly to a new and improved coil form for electronic circuits.

Coils or inductances are used in electronic circuits to provide various devices such as a transformer, a tuned circuit, or some other inductive component. Such coils are generally one of the more expensive items in an electronic circuit, since they must have predetermined characteristics as to length, diameter, number of turns, and spacing to provide the desired inductance. Once a coil has been designed for an electronic circuit, the coil must then be built so that it will have the desired predetermined characteristics. Where the coils are produced in large quantities, such as for home radios or television receivers, each coil should have the predetermined characteristics, and should be as simple and reliable as possible. Where the coil itself is small, or where the coil is to be used in a small or compact electronic circuit, consistently similar coils are more difficult to produce in large quantities.

Accordingly, an object of my invention is to provide a new and improved coil form which can be mass-produced.

Another object of my invention is to provide an improved coil form for receiving a coil that will have predetermined characteristics, even though the coil form is produced in large quantities.

Another object of my invention is to provide a new and improved coil form that can be wound with a coil which will have predetermined characteristics.

Another object of my invention is to provide a new and improved coil form which can be easily threaded with a tuning slug, and which can receive other electrical components to form a compact unit that provides a desired electrical circuit.

Another object of my invention is to provide an improved coil form which can be wound with a coil and which can be provided with other electrical components to provide a unit that is compact, that is consistent in characteristics and properties, and that can be easily mass-produced to provide consistently similar units.

Summary of the invention

Briefly, these and other objects are achieved in accordance with my invention by a coil form which takes the form of an elongated, hollow, plastic cylinder. The cylinder is provided with spiral grooves around its out-

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side. Each of the grooves is separated from the adjacent grooves by spaced walls. The cylinder has a plurality of longitudinal ribs extending along its inside to receive a threaded tuning slug. One or more anchor posts are provided on the outside of the cylinder. Each anchor post has a base extending from the cylinder with two knobs mounted on the top of the base. The knobs are spaced to form a lead receiving groove between the knobs, and are shaped and dimensioned to overhang the base. The cylinder has a configuration at one end that mates with a complementary configuration in a coil form base so that the coil form may be mounted and firmly held.

Brief description of the drawing

The subject matter which I regard as my invention is particularly pointed out and distinctly claimed in the claims. The structure and operation of my invention, together with further objects and advantages, may be better understood from the following description given in connection with the accompanying drawing, in which:

FIGURE 1 shows a perspective view of a coil form in accordance with my invention, the coil form being mounted on a base and being provided with various electrical components;

FIGURE 2 shows a side elevation view of my coil form of FIGURE 1;

FIGURE 3 shows a longitudinal cross sectional view of my coil form taken along the line 3—3 in FIGURE 2; and

FIGURE 4 shows a transverse cross sectional view of my coil form and base taken along the line 4—4 in FIGURE 2.

Description of the preferred embodiment

In FIGURE 1, I have shown one embodiment of a coil form 10 in accordance with my invention mounted on a coil form base 11. However, it is to be understood that my coil form may be used independently and without the base 11. For purposes of explaining my invention, I have assumed that the coil form 10 is to have two inductively coupled bifilar windings or coils, and is to be provided with two diodes 14, 15 and two capacitors 16, 17 to form two tuned circuits. With reference to FIGURES 1, 2, and 3, the coil form 10 comprises an elongated, hollow cylinder 20. The coil form 10 is preferably integral and made of a plastic which has the desired electrical characteristics, which can be easily molded, and which sets on cooling. One such plastic may be polypropylene. The cylinder 20 has the desired internal and external diameters, and is provided with two sets of continuous spiral grooves 21, 22 on the outside. The grooves 21, 22 have the desired length, diameter, and pitch so that wires wound in the grooves 21, 22 will form coils having the desired inductive characteristics. Each of the grooves 21 is separated from the adjacent grooves 21 by walls 23, and each of the grooves 22 is separated from the adjacent grooves 22 by walls 24. The base of the grooves 21, 22 may be flat as shown or may be curved. I prefer that the walls 23, 24 extend radially outward beyond the base of their respective grooves 21, 22 by a distance greater than the diameter of the wire to be wound in the grooves 21, 22 so that the wire turns are consistently separated by a fixed amount of dielectric or plastic material. In addition, after wire has been wound in the grooves 21, 22, the plastic walls 23, 24 may be melted, such as by a hot soldering iron, at precise, selected points so as to firmly fix and seal the wires in the grooves 21, 22, and thus provide an inductance of precise size and characteristics. There may be only one set of grooves. And, the grooves may be arranged to provide single windings, bifilar windings, trifilar windings or other types of windings.

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The cylinder 20 is provided with one or more anchor posts 27. These anchor posts 27 preferably comprise a base 28 which extends radially outward from the cylinder 20. The two projections or knobs 29 are mounted on top of the base 28. The knobs 29 are spaced to form a groove 30, and the knobs 29 are dimensioned to overhang the base 28 preferably around all four sides. Thus, as shown in FIGURE 2, a wire or lead 31 is securely attached to an anchor post 27 in an S-shaped configuration by passing under one knob 29 in one direction, reversing and passing over the top of the base 28 and in the groove 30 in the opposite direction, and reversing and passing under the other knob 29 in the one direction.

The inside of the cylinder 20 is provided with four longitudinally extending ribs 35. The ribs 35 have a generally rectangular cross sectional configuration as shown in FIGURE 4. These ribs 35 are arranged to receive one or more tuning slugs 36 which are made of the desired magnetic material, such as molded ferrite. The tuning slugs 36 have external threads of a diameter slightly greater than the internal diameter of the ribs 35. This permits the tuning slugs 36 to be threaded into the ribs 35. The slugs 36 may be turned by a suitable tool such as an Allen head wrench which can fit in the hexagonal opening 37 in the tuning slug 36. The plastic material forming the ribs 35 is soft enough so that the external threads of the tuning slugs 36 cut their own threads into the ribs 35 as shown in FIGURE 3. Thus, the tuning slugs 36 may be threaded into the cylinder 20 to the desired location to provide the desired inductive characteristics for the coils wound in the grooves 21, 22. While I prefer four ribs 35 for the tuning slugs 36, more or less ribs 35 may be provided.

The coil form 10 as described thus far is preferably made as a single, integral piece. This piece can be easily molded using various known techniques so that large quantities of similar coil forms can be produced. However, if desired, parts, such as the anchor posts 27, of the coil form 10 may be assembled by the use of cement or other adhesives.

The coil form 10 may be used either with or without any supporting means such as the coil form base 11. However, I prefer the coil form base 11 shown in the drawing since it can be provided with a socket 40 for receiving the coil form 10. As shown in FIGURE 4, the socket 40 has an internal configuration that is complementary to the cylinder 20 of the coil form 10. This configuration includes a plurality of internal ribs 41 which are positioned to mate with longitudinal grooves 42 positioned in the lower end of the outer wall of the cylinder 20. When the coil form 10 is to be mounted on the base 11, its grooves 42 are aligned with the ribs 41 and the cylinder 20 inserted into the socket 40. This complementary configuration holds the coil form 10 firmly on the base 11, and prevents rotation of the coil form 10. The base 11 may be made of plastic so that the coil form 10 can be firmly attached to the base 11 by melting together portions of the plastic of the socket 40 and the cylinder 20. As shown in FIGURES 1 and 2, the base 11 may be provided with various configurations in its outer wall. In particular, these configurations include keying grooves 43 to hold the base 11 in a fixed relation in an opening in a panel or printed circuit board. These configurations also include projections 44, 45 which permit the base 11 to be fixed on a panel or printed circuit board. Thus, the base 11 could be inserted from beneath a panel until the center projections 45 pass through the panel to hold the base 11 between the center projections 45 on one side and the outer projections 44 on the other side. The base 11 may also be provided with metallic terminals 46 to which wires or leads can be soldered.

It will thus be seen that my coil form provides a new and improved structure for coils or inductances. My coil form permits coils to be built in mass production with the assurance that each coil wound on the form will have

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the desired electrical characteristics. My coil form also permits the windings or inductances to be adjusted by removal of any part of one or more turns, after which the remaining turns may be firmly held by melting the walls 23, 24. This is important in that the amount and type of dielectric material forming the coil form 10 is not disturbed or modified, as it might be with the use of added adhesives or other materials to anchor or hold the turns or leads. The anchor posts permit various leads to be firmly and securely mounted on the coil form and insure that the mounted components and leads do not move or vibrate, with resultant changes in electrical characteristics. The internal ribs permit tuning slugs to be threaded into the cylinder and held in any desired position of adjustment. And, the coil form permits a compact unit of electrical components to be assembled with secure connections between the components. While I have shown only one embodiment of my invention, persons skilled in the art will appreciate that modifications may be made. For example, single, bifilar, trifilar, or other types of coils or windings may be mounted on the coil form by providing the appropriate grooves. More or less anchor posts may be provided, and more or less internal ribs may be provided for the tuning slugs. Different configurations can be provided to hold the coil form on the base. Therefore, while my invention has been described with reference to a particular embodiment, it is to be understood that modifications may be made without departing from the spirit of the invention or from the scope of the claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An improved coil form for electronic apparatus and the like, comprising:

- (a) an elongated, hollow, plastic cylinder;
- (b) said cylinder having spiral grooves around the outside of said cylinder along at least a portion of its length, each of said grooves being separated from the adjacent grooves by a wall;
- (c) said cylinder having a plurality of longitudinal ribs extending along the inside of said cylinder, said ribs being spaced to receive a threaded tuning slug;
- (d) said cylinder having at least one lead anchor post on said outside of said cylinder, said anchor post having a base mounted on said outside of said cylinder and extending therefrom to terminate in a base top and having two knobs mounted on said base top, said knobs being spaced to form a lead receiving groove therebetween and being dimensioned to overhang said base;
- (e) and said cylinder having a configuration at one end to mate with a base to hold said coil form.

2. The improved coil form of claim 1 wherein said groove walls extend outwardly beyond the base of said grooves by a distance greater than the diameter of the wire to be wound in said grooves.

3. The improved coil form of claim 1 wherein said coil form, said cylinder, said longitudinal ribs, said anchor posts, and said configuration are molded of a single, integral piece of plastic.

4. The improved coil form of claim 3 wherein said groove walls extend outwardly beyond the base of said grooves by a distance greater than the diameter of the wire to be wound in said grooves.

5. An improved form for an inductive wire winding and electronic components, comprising:

- (a) an elongated, hollow cylinder having an inside, an outside, and first and second ends;
- (b) said cylinder having at least one continuous spiral groove formed around said outside for at least a portion of the length of said cylinder, each portion of said groove being formed by a pair of continuous walls which are separated a predetermined distance and which extend outwardly from said outside a distance greater than the diameter of the wire to be positioned in said groove;

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(c) said cylinder having at least two longitudinal, spaced ribs positioned on said inside and extending the length of said cylinder between said first and second ends for receiving a cylindrical, threaded tuning element;

(d) said cylinder having at least one anchor post on said outside near one end, said anchor post having two spaced knobs positioned on a base, said knobs being separated to form a groove therebetween and being positioned and dimensioned to overhang said base around all sides thereof;

(e) and at least one longitudinal groove in said outside of said cylinder extending from one end toward, but short of, the other end to form a configuration that mates with a complementary configuration in a mounting base;

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(f) said cylinder, said groove and walls, said ribs, and said anchor post being an integral piece of plastic material.

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E. A. GOLDBERG, Primary Examiner

U.S. Cl. X.R.

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