Oct. 11, 1966 E. C. COULOMBE ET AL 3,278,876

MOUNTING ARRANGEMENT FOR COIL BOBBINS

Filed March 17, 1965

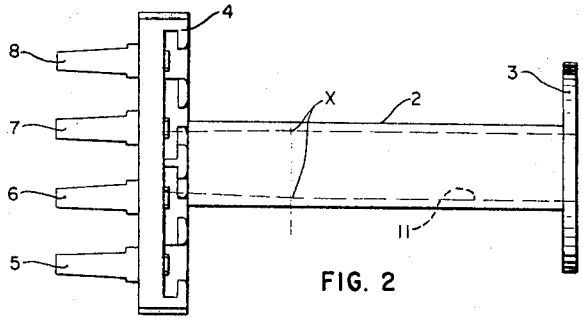


FIG. 2

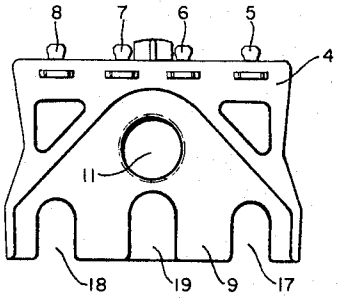


FIG. 4

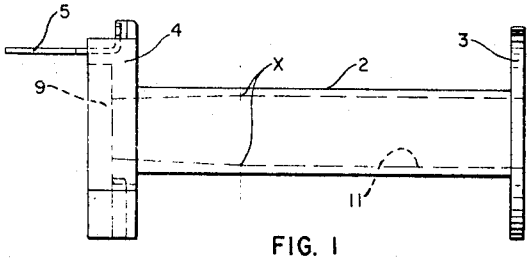


FIG. 1

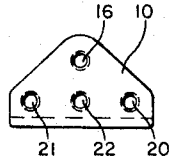


FIG. 7

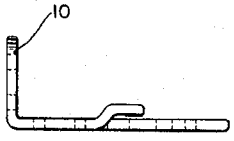


FIG. 6

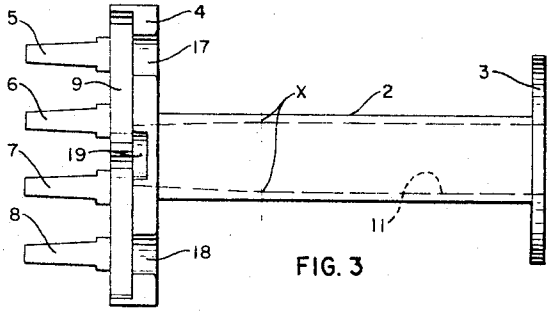


FIG. 3

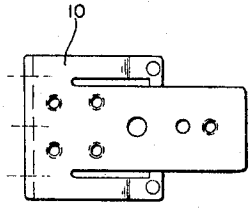


FIG. 8

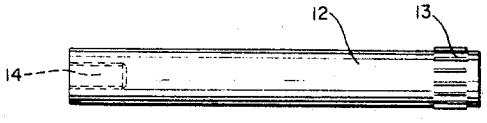


FIG. 5

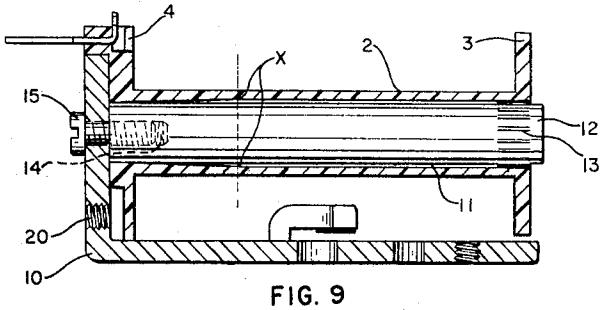


FIG. 9

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MOUNTING ARRANGEMENT FOR COIL BOBBINS

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3 Claims. (Cl. 336—65)

Our invention relates in general to a mounting arrangement for coil bobbins and more specifically to an improved arrangement for assembling a magnetic core and heelpiece to a molded coil bobbin upon which a relay coil is to be wound.

This invention is especially adapted for use in miniature relays where it is important that small overall length be maintained while retaining high sensitivity. The invention is in the nature of an improvement over the arrangement shown in Zerwic Patent No. 3,106,669, granted October 8, 1963. In said prior patent it was found that the assembly there shown was of too great an overall length for certain uses and the present design reduces such length and at the same time provides a core and bobbin structure which is very compact and rigidly constructed and is insensitive to shocks and vibration.

The object of the invention therefore is to provide a molded bobbin assembly in which the core, heelpiece and bobbin are so interlocked and assembled as to provide a compact and readily assembled unit which is shock proof and vibration resistant, as well as of small size.

Among the features of novelty in this arrangement are the tapered shape of the inner cylindrical opening in the bobbin, so that the magnetic core when driven into such opening is force fitted therein, the knurled ribs on one end of the core and the interlocking construction of the heelpiece, core and bobbin.

Having described the general features and object of the invention, we will now describe the same in detail having reference to the accompanying drawing in which:

FIG. 1 is a side view of the molded bobbin of our improved design with the terminals mounted therein.

FIG. 2 is a view of the bobbin taken from the top of FIG. 1.

FIG. 3 is a view taken from the bottom side of FIG. 1.

FIG. 4 is an end view taken from the left side of FIG. 1 showing the formation of the left hand spool head of the bobbin.

FIG. 5 is a view of the magnetic core which is to be inserted in the center opening of the bobbin.

FIG. 6 is a side view of the heelpiece.

FIG. 7 is a view taken from the left of FIG. 6.

FIG. 8 is a view taken from the bottom of FIG. 6.

FIG. 9 is a sectional view of the bobbin taken in the direction of the arrows along line A—A of FIG. 3 and showing the core of FIG. 5 and the heelpiece of FIG. 6 assembled on the bobbin.

Referring to FIGS. 1 to 3 the bobbin or spool **2** is formed of plastic and has the cylindrical center portion with a small circular spool head **3** at its one end and the somewhat rectangular shaped spool head **4** at its opposite end. In the rectangular end are a series of terminals **5**, **6**, **7** and **8** to which the ends of the wires, used to wind the coil windings on the spool, may be soldered. These terminals are inserted through channels in one edge of spool head **4** and the coil wires are attached to the inner terminals such as shown at **5** in FIG. 1.

The outer side of spool head **4** is formed with a series of recesses or indentations as clearly shown in FIG. 4. The larger indentation **9** is formed to exactly fit the

upturned end of the heelpiece **10** shown in FIGS. 6 to 9 inclusive.

Extending throughout the length of bobbin **2** is a cylindrical opening **11** through which the magnetic core **12** (FIG. 5) is to be inserted. This opening is gradually tapered inward from about the center point marked X to the left hand end of the bobbin as shown in FIGS. 1 and 9. Thus the opening at the left hand end thereof is slightly smaller than the opening at the right hand end of the bobbin so that the core **12** of FIG. 5 must be driven into the opening with a force fit until the left hand end of the core **12** is flush with the bottom of the recessed portion **9** in spool head **4** as shown in FIG. 9. The core **12** is also provided at its right hand end with a knurled portion **13** comprising a series of projecting nibs which bite into the walls of the cylindrical opening **11** as shown in FIG. 9 to aid in preventing any rotation of the core **12** when forced into the opening in the bobbin.

The core **12** is also provided in its left or inner end, with a tapped hole **14** into which a screw **15** is fitted to secure the heelpiece **10** to the core. As previously stated, the recess **9** of the spool head **4** is formed to exactly fit the bent up end of heelpiece **10** as seen in FIG. 7. After the core **12** has been driven into opening **11**, the heelpiece is placed as shown in FIG. 9, with its bent up end fitted firmly into recess **9**, and the screw **15** is inserted through clearance hole **16** in the heelpiece and threaded tightly into the threaded hole **14** in core **12**. In this manner the core, heelpiece and bobbin are all tightly interlocked so that no relative movement is possible and the overall length is held as small as possible. The openings **17** and **18** and the recess **19** are provided as clearance holes for screws which may be threaded into holes **20**, **21** and **22** in the heelpiece when the same is mounted on any supporting device. It will be seen that heelpiece **10** has a flat portion extending to the right as seen in FIG. 9, parallel to core **12** and when the relay is completed, an armature (not shown) will be mounted in pivotal relation to the end of the heelpiece in a position to be attracted to the right hand projecting end of core **12** as is customary in such relays.

Having fully described and ascertained the features and aspects of our invention, what we consider to be new and desire to have protected by Letters Patent will be pointed out in the appended claims.

What is claimed is:

1. In an electromagnetic device, a bobbin formed of molded insulating material having a cylindrical portion with a spool head at each end thereof forming a winding space for a coil winding, a cylindrical opening extending throughout the length of said cylindrical portion and being tapered from one point in the length thereof toward one end thereof so that the opening is smaller at one end than at the other, a magnetic core having a threaded hole in one end thereof and a knurled portion adjacent the other end thereof, a heelpiece having a bent up section at one end thereof of a certain substantially triangular shape with a clearance hole therein, one of the spool heads of said bobbin having a formed out depressed portion conforming in shape exactly to the shape of said bent up section of the heelpiece, said core being driven into said cylindrical opening from the larger end thereof with a force fit into said tapered part of the opening until the end of the core with the threaded opening is flush with the bottom of said depressed portion, said bent up section of said heelpiece then inserted into said depressed portion with a screw inserted through the clearance hole in the heelpiece and threaded tightly into the threaded hole in the core, said core, heelpiece and bobbin being rigidly

held against relative movement by means of said force fit of the core and said depressed portion of the bobbin.

2. An electromagnetic device such as claimed in claim 1 in which the driving of said core into said opening leaves an end portion of the core extending outward a short distance beyond the bobbin and causes the nibs of the knurled portion of the core to bite into the wall of said cylindrical opening adjacent the end having the greater opening, to thereby aid in preventing any circular motion of the core in said bobbin.

3. An electromagnetic device such as claimed in claim 1 in which the spool head, having the depressed portion

into which the heelpiece fits, has a series of terminals extending through openings along one edge thereof, and as a series of openings and a further depressed portion extending along one side of the said first depressed portion to provide clearance holes for mounting screws when the device is mounted on any support.

No references cited.

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