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[54] **DEVICE FOR PUTTING TOROIDAL FERRITE CORE ON WIRE**

[76] Inventors: **Yury Emelyanovich Seleznev,** Vesenney proezd, 4a, kv. 16; **Yury Alexandrovich Burkin,** Tsvetnoi procezd, 29, kv. 24, both of Novosibirsk, U.S.S.R.

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[51] **Int. Cl.** **H05k 13/04**

[58] **Field of Search**.....29/203 MM, 203 R, 29/203 MW, 203 P

[56] **References Cited**

UNITED STATES PATENTS

3,339,261 9/1967 Van Der Voo ..... 29/203 MM

3,551,986 1/1971 Lima et al..... 29/203 MM

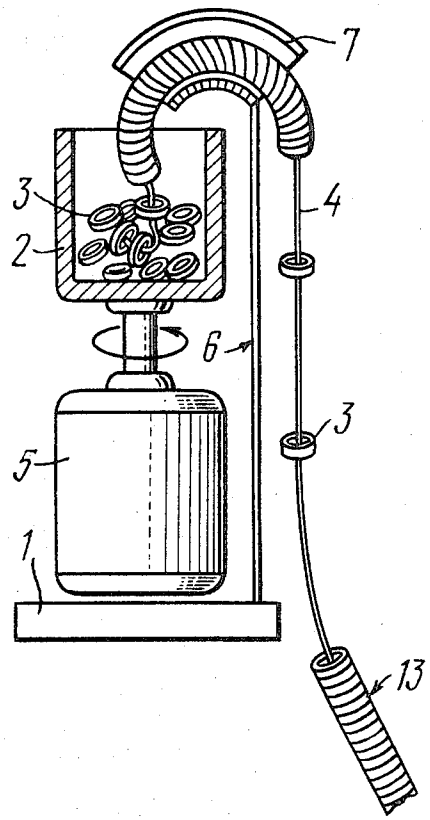
Primary Examiner—Thomas H. Eager

Attorney, Agent, or Firm—Holman & Stern

[57] **ABSTRACT**

A device for putting toroidal ferrite cores on a wire, in which the end of the wire is made at least as a half-turn of a spiral and is lowered into a magazine containing ferrite cores charged therein in bulk and constituting a layer. The magazine is rotated in the direction opposite to that of the winding of the spiral, with the device being provided with a fixing means for preventing the spiral from turning about the base of the device. This fact provides an automatic process of putting ferrite cores of any size on a wire of any diameter.

5 Claims, 3 Drawing Figures



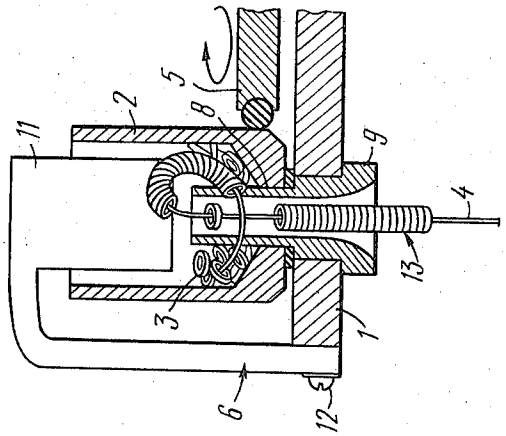


FIG. 3

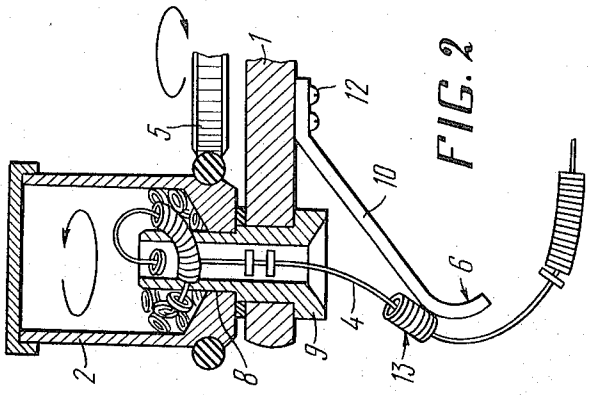


FIG. 2

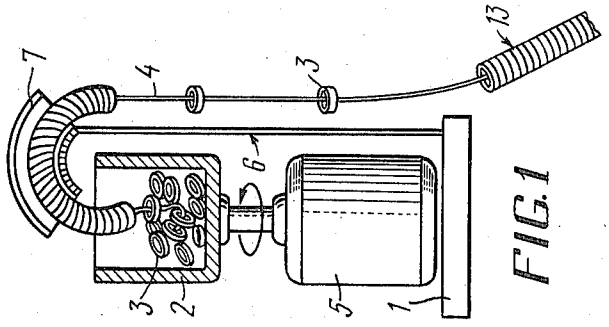


FIG. 1

DEVICE FOR PUTTING TOROIDAL FERRITE CORE ON WIRE

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to processes of making ferrite-core memory cubes for electronic computers and, more particularly, the invention relates to devices for putting toroidal ferrite cores on a wire.

This invention can be used for putting ferrite core of any size, including super-miniature cores featuring properties of dust particles, on sections of wires or on a wire of unlimited length made of any material and having any cross section, including microwires. The operation of putting ferrite cores on a wire is the first stage in a technological process of making ferrite-core memory matrixes and cubes for electronic computers. The wire with a ferrite core installed is used for further operations both in hand interweaving of ferrite matrixes and in mechanical and automatic threading by means of devices which have been recently developed.

Known in the art are devices for putting toroidal ferrite cores on a wire. These devices comprise a vibrobunker for feeding the cores to the working zone, a permanent magnet made in the form of a ring mounted on a rotary drum and a hollow needle containing a wire threaded therein, the needle being fixed to the end face of a hollow conical insert secured in a holder. Disposed on the end face of the insert around the needle are through passages, while the inner channel of the insert is connected to a vacuum pump.

This prior art device is complex in manufacture and, particularly, in adjustment. The vibratory components of the device are quite unreliable in operation and must frequently be readjusted as any change in the stiffness of the material or the magnitudes of the angles of the connecting rods between the vibrator and the bunker, as well as any weakening of the fastenings, result in the failure of the device to operate due to the loss in the direction of vibration. The construction of the receiving portion of the device with a hollow needle and the conical insert as well with a ring of a magnetic material mounted on a rotary drum is rather complicated and the whole assembly is unreliable in operation due to the presence of a vacuum pump and self-contained drives of the pump and drum.

Another disadvantage of the known device is that the vibratory device is useless for putting-on tiny ferrite cores having an outer diameter of 0.6 mm or less where low weight and large "sail area" give to the cores properties of dust particles.

The low efficiency of the known device results in the general use of a manual procedure for putting ferrite cores on a wire.

The hand operation of putting ferrite cores on a wire involves a process in which a wire, the end of which is heat-treated or plated or is equipped with a steel needle brazed thereon, is shaped as a sabre and is periodically inserted by hand into a layer of ferrite cores charged into a bunker or other vessel for putting these cores on the wire.

The disadvantages of the manual operation of putting ferrite cores on a wire include monotony, intricacy and low efficency.

An object of the present invention is to eliminate the above-mentioned disadvantages.

A special object of the invention is to provide a device for putting toroidal ferrite cores on a wire which will be simple and convenient in operation and which will ensure an automatic process of putting miniature ferrite cores on a wire.

This object is attained by providing a device for putting toroidal ferrite cores on a wire in which a magazine charged with ferrite cores is forced into motion in such a manner that the cores move about the wire and are thus placed on this wire. According to the invention, the wire end lowered into the layer of ferrite cores in the magazine is made in the form of at least a half-turn of a spiral, while the magazine is rotated in the direction opposite to that of the coiling of the spiral, with the device being equipped with a fixing means for retaining the spiral against rotation relative to the base of the device.

The fixing means may be made in the form of a guide trough arranged above the magazine, the wire for putting-on the cores passing within the trough.

The bottom of the magazine may be provided with an opening for mounting a sleeve through which a wire used for putting-on the cores is passed, the upper face of the sleeve being located above the layer of cores charged into the magazine.

The fixing means is preferably made in the form of a strap disposed inside the magazine below the sleeve and intersecting the axis of rotation of the magazine or in the form of a fixed plate disposed inside the magazine eccentrically relative to the sleeve opening.

Such a device allows the process of putting ferrite cores on a wire to be effected automatically regardless of the size of the cores and the diameter of the wire. The proposed device can also be used for rejection of ferrite cores having no central hole.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood from the following detailed description of some embodiments of the invention, reference being made to the accompanying drawings, in which:

FIG. 1 is a diagrammatic view of the device for putting toroidal ferrite cores on a wire, according to the invention;

FIG. 2 is a modification of the device of FIG. 1 with an opening in the magazine bottom, according to the invention; and

FIG. 3 is a modification of the device of FIG. 1 with a fixing means in the form of a plate disposed inside the magazine, according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The device for putting toroidal ferrite cores on a wire comprises a base 1 (FIG. 1) on which is arranged a magazine 2 made in the form of cylindrical cup with an open upper portion. Ferrite cores 3 are charged into the cup 2 from above.

Lowered into the layer of cores 3 is an end of a wire 4 intended for putting thereon the ferrite cores 3. The end of the wire 4 immersed into the layer of ferrite cores is made in the form of a complete or partial turn of a spiral. The magazine 2 is rotated by a drive 5 in the direction opposite to the direction of winding of the spiral turn. The device is equipped with a fixing means 6 serving to keep the wire 4 in a definite position rela-

tive to the magazine 2 for preventing rotation of the spiral about the base 1.

The fixing means 6 may be made in the form of a guide trough 7 or as a tube disposed above the magazine 2 and secured to the base 1. The wire 4 for putting-on the cores is placed inside the trough 7, the inner diameter of which must somewhat exceed the outer diameter of the cores 3 so as to provide for their unobstructed motion along the wire 4.

The magazine 2 (FIG. 2) may have an opening 8 in its bottom in which is mounted a sleeve 9 through which is passed the wire 4. The upper face of the sleeve 9 is located inside the magazine 2 above the layer of cores 3 charged into the magazine.

In one embodiment of the invention the fixing means 6 is made in the form of a strap 10 located below the sleeve 9 and intersecting the axis of rotation of the magazine 2. In this case the wire 4 leaving the sleeve 9 is somewhat bent in accordance with the shape of the fixing strap 10.

In another embodiment of the invention (FIG. 3) the fixing means of the device is made in the form of a plate 11 placed within the magazine 2 and rigidly secured on the base 1 of the device with the aid of a screw 12. The plate 11 is disposed above the sleeve 9 with a small gap with some eccentricity relative to the axis of rotation of the magazine 2 so that it does not close the opening of the sleeve 9.

The cores 3 put on the wire in the form of columns 13 are transferred along the continuation of the wire 4 beyond the device for practically an unlimited length.

The principle of operation of the device for putting toroidal ferrite cores on a wire is as follows:

Before starting the operating cycle, the magazine 2 (FIG. 1) is charged with ferrite cores 3, in which case the wire 4 to be used as a threader of the cores 3 is passed through the fixing means 6 and its end is coiled and lowered into the layer of cores 3.

Then the drive 5 is switched on and the magazine 2 is rotated in the direction opposite to the direction of winding of the coil. Simultaneously with the rotation of the magazine 2, the cores 3 are forced to rotate in the same direction. Since the end of the wire 4 is coiled into a spiral and is directed against the rotation of the layer of ferrite cores 3, a portion of these cores 3 is put on the wire 4 as a column 13 due to the interaction with the cores 3 moving together with the magazine 2 and is moved upwards clearing a space at the end of the spiral for putting the next cores 3 on the wire. The column 13 of cores 3 moves up along the wire 4 to the fixing means 6, passes therethrough and moves down along the descending branch of the wire.

If the fixing means is made in the form of a tube or a trough 7 disposed above the magazine 2, the wire 4 is passed through this tube or trough.

If the fixing means 6 is made in the form of a strap 10 (FIG. 2), the wire 4 is passed through the sleeve 9, then the end of the wire 4 is coiled into a spiral. During the operation of the device the columns 13 of cores 3 descend along the wire 4 enveloping the strap 10 which does not allow the wire 4 to rotate about the axis of rotation of the magazine 2.

If the fixing means 6 is made in the form of a plate 11, the wire 4 is passed through the sleeve 9, then the end of the wire is coiled into a spiral. During the operation of the device the columns 13 of cores 3 descend through the sleeve 9 along the straight portion of the wire 4, in which case the plate 11 prevents the wire 4 from turning about the axis of rotation of the magazine 2.

In all cases of using the fixing means 6, the wire 4 during the operation of the device is subject to some vibration due to the interaction with the cores 3 occupying the magazine 2 and this fact, in turn, facilitates the movement of the columns 13 of cores 3 through the fixing means 6.

The proposed device provides for an automatic process of putting toroidal ferrite cores of any size on a wire of any diameter. The device is simple to manufacture and is reliable in operation.

What is claimed is as follows:

1. A device for putting toroidal ferrite cores on a wire comprising in combination: a base; a magazine disposed on said base and charged with ferrite cores constituting a layer; a wire for putting-on the cores having one end lowered into said magazine and being made in the form of at least a half-turn of a spiral; a drive rotating said magazine in the direction opposite to the direction of winding of the spiral and, at the same time, rotating the layer of ferrite cores charged into the magazine so that the cores move relative to the end of the wire and are put on this wire; and a fixing means secured on said base, interacting with said wire and preventing rotation of said end of said wire relative to said base.

2. A device as claimed in claim 1, in which the fixing means is made in the form of a guide trough disposed above said magazine, the wire for putting-on the cores passing within said trough.

3. A device as claimed in claim 1, in which said magazine has an opening in its bottom while the device itself includes a sleeve mounted in said opening so that its upper face is always above the layer of cores charged into said magazine; the wire for putting-on said cores being is passed through said opening.

4. A device as claimed in claim 3, in which said fixing means is made in the form of a strap disposed below said sleeve and intersecting the axis of rotation of said magazine.

5. A device as claimed in claim 3, in which said fixing means is made in the form of a fixed plate disposed within said magazine eccentrically relative to the opening of said sleeve.

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