# United States Patent

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[54] **DEVICE FOR RENDERING UNIFORM THE FEED OF INCANDESCENT FILAMENTS OF LIGHT SOURCES**


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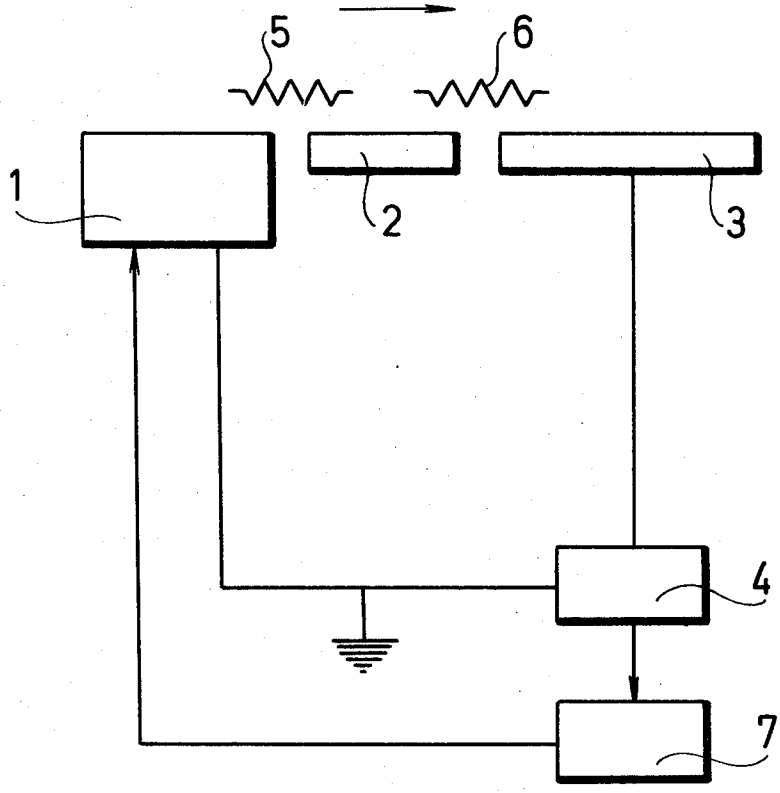
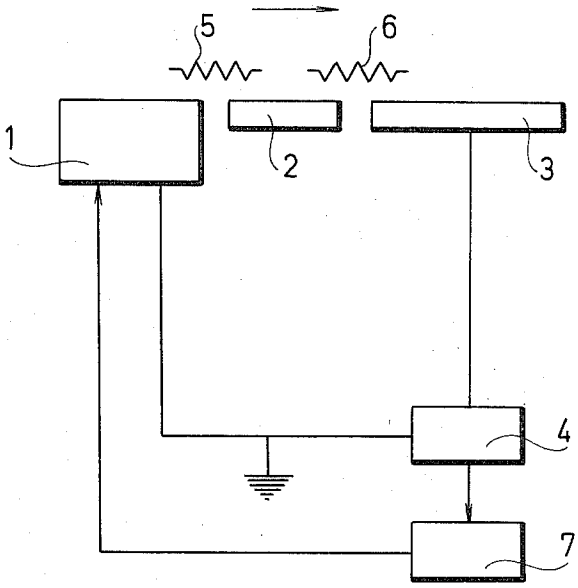
[57] **ABSTRACT**

An arrangement for feeding successive coils of wire endwise in spaced relationship. The coils are successively fed by a vibration feeder over two longitudinally spaced electrically isolated guide sections which are connected in series with a power source, a relay, and with the motor of the vibration feeder. When two successive coils are so spaced as to overlie the vibration feeder and the first isolated path section, on the one hand, and the first and second isolated path section on the other, the vibration feeder is stopped for a predetermined period during which the first fed coil continues to travel under an effect other than that of the vibration feeder.


**10 Claims, 1 Drawing Figure**



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# DEVICE FOR RENDERING UNIFORM THE FEED OF INCANDESCENT FILAMENTS OF LIGHT SOURCES

An important part of electrical light sources such as incandescent lamps and discharge tube is the helical incandescent coil or filament.

The coils are fitted to the electrodes of the light sources by means of so-called assembling devices which feed the coils either by hand or automatically. The automatic feeding of the coils consists of two phases.

In the first phase, the preliminary arrangement of the very thin and flexible coils is carried out. This is generally done in a known way by means of an electromagnetic vibration feeder so that the coils, fed in bulk, will arrive at the end of the helical delivery path of the vibration feeder one after the other, in the same relative oriented position.

In the second phase, the feeding at a uniform rate of the already arranged or oriented coils arriving in the same relative position is such that the feeding rate, that is, coils per minute, should correspond to the number of steps per minute of the assembling device, i.e., one coil should be fed for each assembling step.

The various coil feeding systems provide for different methods of feeding of the coils at a uniform rate. Each system tries to produce in the first phase of the preliminary arrangement as uniform an output of the vibration feeder as can be achieved. Each system tries to insure that the ends of the coils leaving the vibration feeder do not touch each other, since the separation of intertwined coils is difficult or is not at all possible; tangled coils must be discarded as waste.

The required space between the previously arranged coils is insured with known systems (e.g. French Pat. No. 1,352,457). In one known system the ends of the coils arriving from the vibration feeder engage an electrical contact and thus completes an electrical circuit which stops the vibration feeder until such contact-engaging coil is deflected to another path. In another known system, the presence of each coil coming from the vibration feeder is sensed by a photoelectric or othermeans and when sensed, it stops the vibration feeder until the coil is removed. The drawbacks of these solutions are as follows:

a. The output of the vibration feeder is lower, since with the preliminary arrangement on the vibration feeder, the vibration feeder must be stopped for a certain period when a coil arrives at a non-uniform distance from the delivery path.

b. Due to the non-uniform output of the vibration feeder, very often two coils arrive immediately one after the other; in such cases both coils are delivered further without being separated and without the required individual feeding.

The device according to the invention insures by simple means both the maximum output of the vibration feeder and the separation of the coils arriving one immediately after the other. Such device is characterized by the fact that the coils emerging from the vibration feeder at irregular intervals travel on an electrically insulated section of an electrically conductive supporting guide of given or adjustable length. If two coils arrive within a guiding path section of given length, these two coils extending over the insulated electrically conductive guide part close a circuit, as a consequence of which the vibration feeder stops. Then, after a preset period, the vibration feeder starts again. The apparatus is so constructed and arranged that during the period of cessation of the vibration feeder one of the coils in question freely travels under the effect of gravitation, amplitude difference, air blast, or other power effect, and/or of their combination.



The invention will be described more detailed by way of the enclosed schematic drawing labelled FIG. 1.

The coils leaving the vibration feeder **1** first pass over the insulated electrically conducting path section **2** and then over path section **3**. The input point of the sensing unit **4** is connected to path section **3**, which is electrically conducting. The feeder **1**, section **2**, and section **3**, are disposed in alignment and separated from each other, as shown.

If the distance between the coils **5** and **6** leaving the vibration feeder **1** is smaller than the length of the electrically conducting isolated path section **2**, the coil **5** electrically connects the vibration feeder **1** to the isolated path section **2**, while the coil **6** electrically connects the insulated path section **2** to the isolated path section **3**. Thus, the input circuit of the sensing unit **4** is closed. The output of the sensing unit **4** is connected to a control unit **7**; the output signal of the sensing unit **4** stops the vibration feeder **1** for a predetermined time. The vibration feeder **1** being cut out for a given time, the coil **5**, a part of which overlies the feeder, stays in its place while the coil **6** continues its travel on a gravity path or under any other power effect (not shown). When coil **6** no longer engages section **3**, the electrical connection between the isolated path sections **2** and **3** ceases.

The vibration feeder **1** being cut out, the coil **6** continues its travel under gravity or any other power effect, so that the required distances between the coils **5** and **6** is established. A given time having elapsed, the control unit **7** which has a mechanical or electronic time delay means, e.g., a monostable multivibrator restarting the vibration feeder after a preadjustable time, switches the vibration feeder **1** in again, and the coil **5** starts to travel again.

If the distance between the coils **5** and **6** as they leave the vibration feeder **1** one after the other is greater than the length of the isolated path section **2**, the input circuit of the sensing unit **4** will not be closed and the vibration feeder **1** will continue to feed the coils **5** and **6**. In this way the maximum output of the vibration feeder **1** is insured with an optimum preliminary arrangement, since the vibration feeder stops when, and exclusively in case when, the distance between two coils following each other is smaller than the minimum space required for the uniform feeding.

Although the invention is illustrated and described with reference to a plurality of preferred embodiments thereof, it is to be expressly understood that it is in no way limited to the disclosure of such a plurality of preferred embodiments, but is capable of numerous modifications within the scope of the appended claims.

What is claimed is:

**1**. A device for the arrangement of axially elongated coils of small gauge wire which are successively fed forwardly in their axial directions at irregular intervals along a predetermined path by a motor driven feeder,

comprising three serially spaced electrically conducting, electrically isolated coil guiding and supporting sections, the first of said sections selectively imparting propelling force to the coils from the motor driven feeder, the first and second, and the second and third sections being spaced apart by distances which are less than the length of the coils, a source of electrical power, a selectively closable switch, circuit means connecting the first and third sections with the power source, the switch, and motor of the feeder, and control means responsive to the bridging of the first and second sections by a second fed coil and the bridging of the second and third sections by a first fed coil to open the switch to stop the motor of the feeder.

2. A device according to claim 1, wherein the feeder is a vibration feeder, and the first section is a vibrated table which is a part of the vibration feeder.

3. A device according to claim 1, comprising time delay means for holding the switch open for a predetermined time after it has been opened by the control means, and for thereafter closing it.

4. A device according to claim 3, wherein the time delay means is mechanical.

5. A device according to claim 3, wherein the time delay means is electronic.

6. A device according to claim 5, wherein the time delay means is a monostable multivibrator.

7. A device according to claim 1, comprising means to forward the first fed coil after the stopping of the motor driven feeder.

8. A device according to claim 7, wherein the means to forward the first fed coil feeds such coil by gravity.

9. A device according to claim 7, wherein the means to forward the first fed coil feeds such coil by a discharge of gas under pressure.

10. A device according to claim 7, comprising a non-radial path section eliminating the vibration amplitude higher than the existing vibration amplitude of the vibration feeder at the input point of the guide path in order to further the first fed coil after the restarting of the vibration feeder.

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