

Oct. 28, 1969

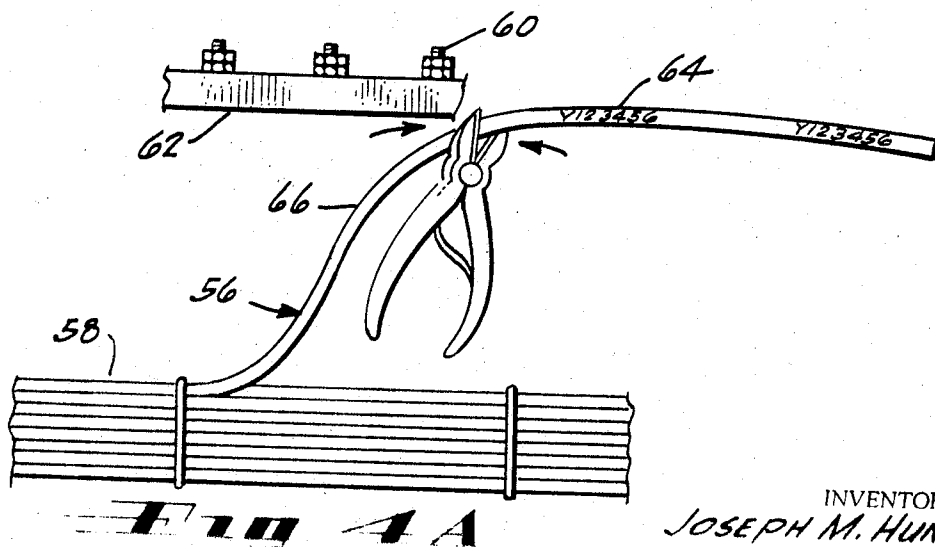
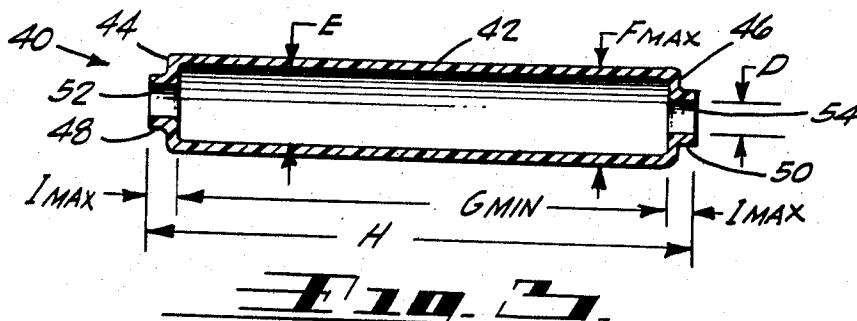
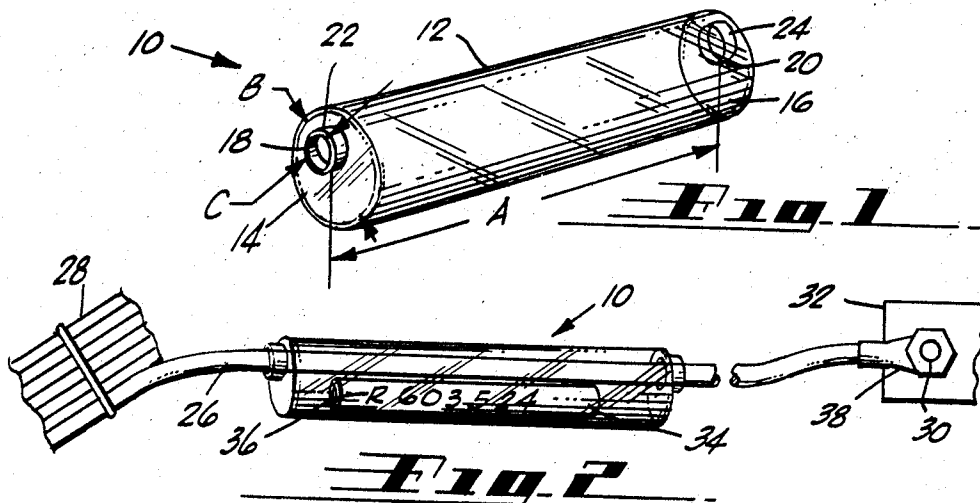
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3,474,559

MEANS AND METHOD OF WIRE IDENTIFICATION

Filed March 13, 1968

2 Sheets-Sheet 1



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MEANS AND METHOD OF WIRE IDENTIFICATION

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2 Sheets-Sheet 2

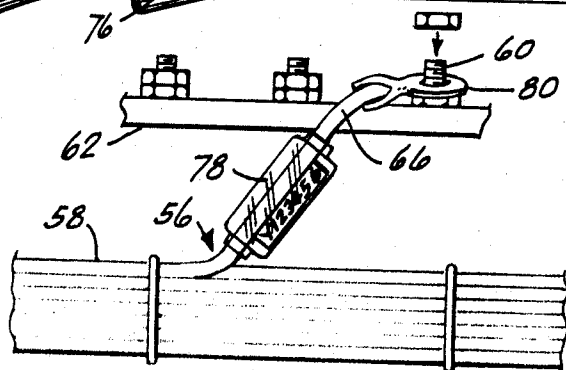
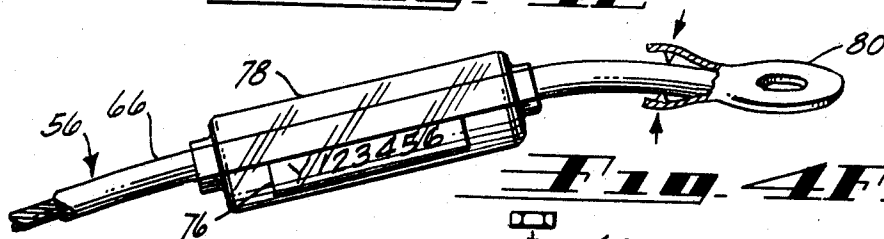
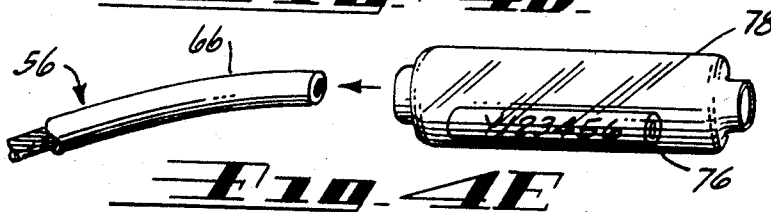
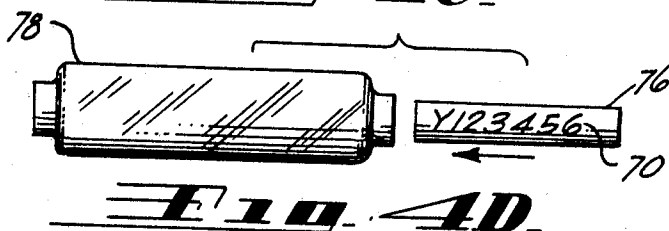
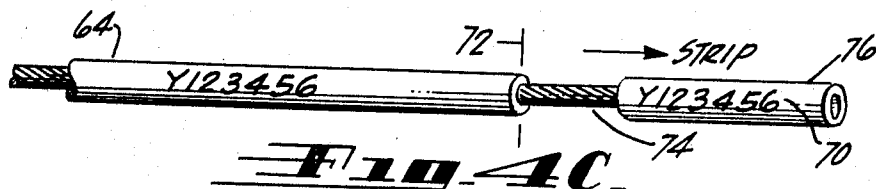
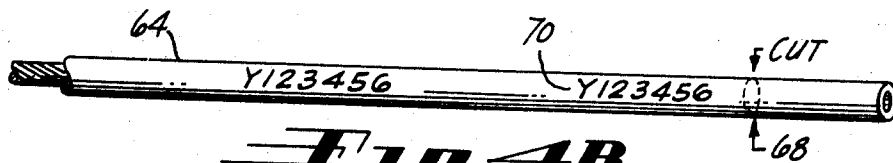


Fig. 4G

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MEANS AND METHOD OF WIRE IDENTIFICATION

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10 Claims

ABSTRACT OF THE DISCLOSURE

A wire identification pod including a transparent tubular body and recovered end walls closing the ends of the tubular body, the end walls having respective collars defining extended, axially aligned, short passageways therein for passing a wire requiring identification there-through and thereby support the pod on the wire. The tubular body is sufficiently large to accommodate a segment, bearing a wire identification number thereon, removed from an excess length or discarded portion of the wire, and the axially aligned passageways are large enough to permit insertion of the segment into the tubular body before installing the pod on the wire.

BACKGROUND OF THE INVENTION

My invention pertains generally to the field of wire identification and more particularly to a means and method for enabling the prompt, accurate and durable provision of correct identification indicia on wires being installed and/or connected in, for example, a large transport aircraft, or in any structure or craft utilizing identified wires therein.

Wiring used on relatively small vehicles such as automobiles is normally identified by color coding, as is well-known. The wires on such vehicles have different exterior colors or different combinations of colors throughout their lengths in order to identify the various wires. For example, the insulation covering on automobile wires may be blue, green, yellow, red, black, blue with yellow striping, black with red striping, etc. A fairly large number of wires can be adequately identified by means of such color coding. It is believed to be apparent, however, that while color coding of wires may be feasible for automobiles, small boats and other relatively small vehicles or structures, it is impractical to employ such identification for the numerous wires on large transport aircraft, certain large ships and the like.

A large transport aircraft easily requires over 20,000 wires, for example, which connect and interconnect with a large number of different systems and devices. In instances such as this, the wires must be identified by letters and numerals and other appropriate symbols. Such indicia are used not only to identify each wire, it is also generally used to identify the particular system or circuit with which each wire is associated. To illustrate, in a number or indicia as Y123456, the letter "Y" could denote that the wire is associated with the ignition system in a four-engine aircraft, the first numeral thereof. "1" could indicate that the wire is associated with the ignition circuit for the No. 1 engine, and so forth.

These numbers or indicia are normally stamped or otherwise printed on each wire at spaced intervals over the length thereof. Such numbers or indicia are commonly spaced approximately 15 inches apart on a wire which is usually many feet long for large aircraft, and as close as possible on the last 3 or 4 feet of each end of the wire. Present wire stamping machines print numbers on a wire as close together as 3 inches, approximately, although some of the older machines are built to print numbers on a wire at about 1½ inch minimum

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spacings. Thus, predetermined lengths of wire are suitably stamped with appropriate identification numbers or indicia thereon prior to assembly into suitable wire bundles which are installed in an aircraft, for example. Exposed lengths of wire ends having the closely spaced identification numbers thereon emanate from different points along the length of the wire bundle for connection into the various systems and circuits of the aircraft.

Very often, however, the identified wire ends must pass through openings in bulkheads or other structure wherein it so happens that the wire identification numbers on the exposed wire end would be obscured by the intervening structure. In other instances, the exposed length of wire bearing its identification number thereon is too long and must be shortened such that the remaining exposed length of wire is left devoid of any identification number thereon. When either of these situations occurs, the practice has been to order small tubular sleeves which have the correct wire identification numbers stamped thereon from a suitable source that is invariably located remotely from the aircraft since the stamping or printing apparatus and its associated facilities require considerable housing space. These simple tubular sleeves are generally constructed to have inner diameters which fit reasonably well on their corresponding wires. However, a delay of 2 or 3 days is usually incurred before the stamped sleeves are received and, sometimes, the wrong number is then found printed on some of the ordered sleeves. In any event, it is evident that the delay and loss resulting from such a necessary procedure will be quite significant and costly.

SUMMARY OF THE INVENTION

Briefly, and in general terms, my invention is preferably accomplished by providing a wire identification pod including a transparent tubular body and recovered end walls closing the ends of the tubular body, the end walls having respective necks or collars defining extended, axially aligned, holes or relatively short passageways therein to fit closely on a wire requiring identification and thereby support the pod on the wire, and the tubular body being sufficiently large to accommodate a wire identification number-bearing segment cut from a surplus portion of the wire and inserted into the pod through one of the holes or passageways in its end walls before the pod is installed on the wire. The inner conductor of the wire is preferably removed from the cut segment before it is inserted into the pod to eliminate the weight of such inner conductor.

It should be apparent from the foregoing brief description that suitable pods according to this invention could be manufactured and made available before the installation or connection of identified wiring in a large transport aircraft, for example. Then, whenever the situation arises wherein additional wire identification is required, a wire segment bearing the proper identification number thereon is obtained from an excess length or discarded portion of the pertinent wire and inserted into an appropriate pod which is next installed on the wire at the point where additional identification is required. This procedure will clearly eliminate the significant delay and loss resulting from the prior procedure followed wherein tubular sleeves bearing the wire identification numbers thereon must first be ordered and then subsequently installed on the corresponding wires when the ordered sleeves are received.

BRIEF DESCRIPTION OF THE DRAWINGS

My invention will be more fully understood, and other features and advantages thereof will become apparent, from the following description of certain exemplary embodiments of the invention. The description is to be taken

in conjunction with the accompanying drawings, in which:
FIGURE 1 is a perspective view of one version of a wire identification pod which is constructed in accordance with this invention;

FIGURE 2 is a fragmentary perspective view showing the pod of FIGURE 1 installed on an exposed length of wire extending from a wire bundle to a terminal board;

FIGURE 3 is a longitudinal sectional view of another version of a wire identification pod which is constructed in accordance with the principles of this invention; and

FIGURES 4A, 4B, 4C, 4D, 4E, 4F and 4G are generally perspective views which depict successive steps of a method for providing identification to a wire according to my invention.

DESCRIPTION OF THE PRESENT EMBODIMENTS

FIGURE 1 is a perspective view of one version of a wire identification pod 10 which is constructed in accordance with my invention. The pod 10, in this instance, includes a cylindrical tube 12, made of a fairly soft and clear plastic material, and end walls 14 and 16 having respective holes or passageways 18 and 20 therein. The passageways 18 and 20 are further defined by respective necks or collars 22 and 24 of relatively negligible axial or longitudinal length, in this case. The necks or collars 22 and 24 can be entirely omitted or removed but they are normally desirable for producing extended passageways 18 and 20 to provide increased support area therein. The planes of the end walls 14 and 16 are preferably parallel to each other and perpendicular to the central axis of the tube 12. The passageways 18 and 20 are located in the normally upper portions of their respective end walls 14 and 16, and have centers which are aligned on an axis that is parallel to the axis of the tube 12. The tube 12 has a length of dimension A and an inner diameter of dimension B, as indicated. The passageways 18 and 20 both have a diameter of dimension C. The tube 12 and the passageways 18 and 20 can, of course, be other than circular. For example, the tube 12 can have a cross section which is elliptical, and the passageways 18 and 20 may be rectangular in cross section.

Illustratively, the material used in fabricating the pod 10 may be .010 to .020 inch thickness nylon, polyvinylidene chloride or irradiated polyolefin. When irradiated polyolefin or similar material is used, the end walls 14 and 16 and their respective holes 18 and 20 (together with the short collars 22 and 24) may be formed by heat shrinking each end of the tube 12 and inserting a suitable mandrel into the end while it is still hot. The recovered ends thus formed for the pod 10 may, of course, vary slightly in squareness and in overall axial length for each end. The diameters of the holes or passageways 18 and 20 are both, for example, approximately half the inner diameter of the tube 12. Typically, wires of .060 to .080 inch in diameter would use a pod 10 having dimensions A of $1\frac{1}{8}$ inch, B of $\frac{3}{16}$ inch and C of $\frac{3}{32}$ inch. It is to be understood, of course that the types of materials and specific dimensions noted herein are merely given by way of example only, and are not to be construed as limiting on the invention in any manner.

FIGURE 2 is a perspective view showing the pod 10 installed on a wire 26 running from a wire bundle 28 and connected to a terminal 30 on a terminal board 32. The wire 26, in this instance, was excessively long between the wire bundle 28 and the terminal 30. The excess length of the wire 26 including its identification number thereon was cut off leaving an exposed length of the wire 26 extending from the wire bundle 28 but having no identification number on such exposed length. An identification number on the cut-off portion of the wire 26 was, therefore, removed from such portion by further cutting out a segment 34 thereof including the wire identification number 36 thereon. The inner conductor of the wire segment 34 may be removed therefrom, if desired, and the remaining outer covering of segment 34 inserted into the

pod 10 through either of the holes or passageways 18 or 20. The pod 10 containing the segment 34 is then installed on the exposed length of wire 26 extending from the wire bundle 28. Finally, a lug 38 is suitably attached to the end of the now identified wire 26 and secured to the terminal 30 on the terminal board 32.

FIGURE 3 is a longitudinal sectional view of another version of a wire identification pod 40. The pod 40, in this instance, is symmetrical and the longitudinal sectional view is, of course, taken on a vertical diameter longitudinally along a tubular cylinder 42 which has a circular cross section. The recovered ends of the cylinder 42 include end walls 44 and 46 having respective necks or collars 48 and 50 which define central holes or passageways 52 and 54 therein. The collars 48 and 50, and their respective passageways 52 and 54, are concentric to the axis of the cylinder 42 and have circular cross sections, for example. The pod 40 has passageways 52 and 54 with diameters of dimension D, a cylinder 42 inner diameter of dimension E and a maximum outer diameter dimension F_{max} , cylinder 42 minimum length of dimension G_{min} , an overall pod axial length of dimension H, and passageways 52 and 54 maximum axial lengths of dimension I_{max} as indicated.

To accommodate wires having outer diameters of .060 to .080 inch, the dimension D is .085 inch, dimension E is .165 inch, dimension F_{max} is .220 inch, dimension G_{min} is 1.000 inch, dimension H is 1.170 inches, and dimension I_{max} is .070 inch, for example. For comparison and as another illustrative example only, to accommodate wires having outer diameters of .100 to .120 inch, the dimension D is .130 inch, dimension E is .240 inch, dimension F_{max} is .310 inch, dimension G_{min} is 1.250 inches, dimension H is 1.420 inches, and dimension I_{max} is .070 inch. Manufacturing tolerances have been omitted from the foregoing specific dimensions since they have been given only for illustrative purposes. The pod 36 is preferably fabricated of heat shrinkable, radiation cross-linked polyvinylidene fluoride, natural. Other materials can, of course, be used but the foregoing material is particularly suited for aircraft usage since such material can withstand an environment having a wide temperature range, possible contact with different liquids (hydraulic fluids, fuel, oil, etc.) and various other factors, and yet provide a very long life of, for example, at least 20 years.

FIGURES 4A, 4B, 4C, 4D, 4E, 4F and 4G are generally perspective views which depict successive steps of a method for identifying a wire according to my invention. In FIGURE 4A, a wire 56 from a wire bundle 58 is to be connected to a nearby terminal 60 on a terminal board 62. The wire 56 is excessively long so that an end portion 64 is cut off the wire 56 leaving a suitable remaining length 66 of wire 56 extending from the wire bundle 58 to the terminal 60, but which length 66 does not have a wire identification number left thereon. The end portion 64 is cut at a point 68 near one end of a wire identification number 70 as indicated in FIGURE 4B. The end portion 64 is then partially cut at a point 72 near the other end of the identification number 70 and stripped off the wire conductor 74 as shown in FIGURE 4C. This provides a relatively short and very light segment 76 of the outer, insulation portion of the wire 56 and which segment 76 bears an identification number 70 thereon.

The segment 76 is then inserted as indicated in FIGURE 4D into a suitable pod 78 which, in this instance, is similar to the pod 40 illustrated in detail in FIGURE 3. The pod 78 carrying the segment 76 therein is next installed onto the remaining exposed length 66 of the wire 56 as indicated in FIGURE 4E. A lug 80 is then appropriately attached to the end of the exposed length 66 of the wire 56 as shown in FIGURE 4F. Finally, the attached lug 80 is secured to the terminal 60 on the terminal board 62 as illustrated in FIGURE 4G. The pod 78 fits frictionally on the wire 56 and can be easily rotated thereon so that the wire identification number 70 can be

suitably oriented at any time for ready and clear visibility.

Modifications or extensions of my invention can, of course, be readily made. For example, in a two-phase or three-phase system wherein two or three wires, respectively, may be maintained closely together throughout most of their lengths, a wire identification pod can be fabricated which has two or three similar sections that are each equivalent to the pod 10 shown in FIGURE 1. In effect, two or three of the pods 10 are suitably combined together into an integral unit. The sections can be arranged generally parallel to each other side-by-side, or as tubular sectors in a circular arrangement. Other variations of the invention can be similarly devised.

While certain particular embodiments of my invention have been described above and shown in the accompanying drawings, it is to be understood that the described embodiments are merely illustrative of, and not restrictive on, the broad invention and that various changes in design, structure and arrangement may be made in the disclosed embodiments of my invention without departing from the spirit and scope of the following claims defining this invention.

I claim:

1. A wire identification pod comprising:
a transparent tubular body including first and second ends; and
first and second end walls for closing said first and second ends, respectively, of said tubular body, said first end wall including a first passageway therein and said second end wall including a second passageway therein, said first and second passageways being of a predetermined cross sectional size to pass a wire requiring identification therethrough and thereby support said pod on said wire, and said tubular body being sufficiently large to accommodate a surplus segment of wire bearing wire identification indicia thereon and which can be inserted into said tubular body through one of said first and second passageways prior to installation of said pod on said wire.
2. The invention as defined in claim 1 wherein said first and second passageways are located in normally upper portions of said first and second end walls, respectively.
3. The invention as defined in claim 1 wherein said first and second passageways are respectively located centrally in said first and second end walls.
4. The invention as defined in claim 1 wherein said tubular body is cylindrical, having a central longitudinal axis, and said end walls are generally oriented perpendicularly with respect to said axis.
5. The invention as defined in claim 4 wherein said first and second end walls include first and second collars, respectively, defining extensions of said first and second passageways, said first and second passageways

being circular in cross section and located in normally upper portions of said first and second end walls.

6. The invention as defined in claim 4 wherein said first and second end walls include first and second collars, respectively, defining extensions of said first and second passageways, said first and second passageways being circular in cross section and located centrally in said first and second end walls.

7. The invention as defined in claim 1 wherein installation of said pod on said wire requiring identification includes the method which comprises the steps of cutting a segment bearing wire identification indicia thereon from a surplus portion of said wire, inserting said cut segment into said tubular body through one of said first and second passageways, and passing said wire through said first and second passageways whereby said pod containing said cut segment is supported on said wire.

8. The invention as defined in claim 7 including the additional step of removing the inner conductor portion from said cut segment prior to inserting it into said tubular body.

9. The invention as defined in claim 1 wherein installation of said pod on said wire requiring identification includes the method which comprises the steps of cutting an excess length having a wire identification number thereon from said wire, removing a segment bearing said wire identification number thereon from said cut excess length, inserting said segment into said tubular body through one of said first and second passageways, and passing said wire through said first and second passageways whereby said pod containing said segment is supported on said wire.

10. The invention as defined in claim 9 including the additional step of removing the inner conductor portion from said segment prior to inserting it into said tubular body.

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U.S. Cl. X.R.

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