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(54) Wire spool with color identification

(57) A wire spool (10) with color identification includes an axial tube (20), a first flange (30) extending from a first end (21) of the axial tube (20), and a second flange (40) extending from a second end (22) of the axial tube (20). The wire spool (10) is characterized in that the first flange (30) has at least one depression (32) coated with a color layer (48). Thus, the color layer (48) is not easy to peel and the cost of manufacturing the wire spool (10) can be reduced.

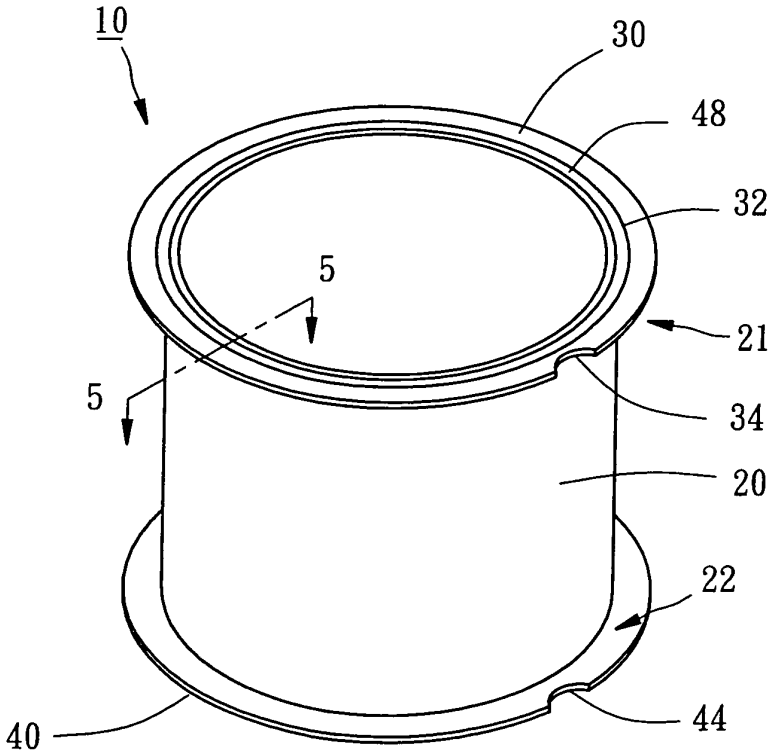

FIG. 4

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a wire spool and more particularly to such a wire spool with color identification, the color layer of the wire spool is not easy to peel and the cost of manufacturing the wire spool can be reduced.

2. Description of the Related Art

[0002] The bonding wire used in the package process of semiconductor element is wound around a wire spool for store or transport. As shown in FIG 1, the wire spool **1** has a metal core coated with an antirust layer **2** for avoiding oxidization of the metal core. The inner wall of the axial tube **3** and the outer walls of the two flanges 4 of the wire spool **1** are further coated with a nickel layer **5** for conducting electricity. The antirust layer **2** is added with coloring agent during manufacture to show specific color. The bonding wire with different diameter is wound around the wire spool with different color for identification. However, it costs higher to coat the wire spool **1** with two layers successively, i.e. the antirust layer **2** first and the nickel layer **5** later.

[0003] To reduce the manufacture cost of the wire spool, the nickel layer is coated on the whole surface of the metal core instead for avoiding oxidization of the metal core and conducting electricity. As shown in FIGS. 2-3, the outer wall of one flange **7** of the wire spool **6** is coated with a color layer **8** for identification. However, the bare color layer **8** is easy to peel due to collision or attrition during operation to generate tiny particles pollution.

SUMMARY OF THE INVENTION

[0004] An objective of the present invention is to provide a wire spool with color identification, which has color layer that is not easy to peel to generate tiny particles pollution.

[0005] The other objective of the present invention is to provide a wire spool with color identification, the cost of manufacturing the wire spool can be reduced.

[0006] The foregoing objective of the present invention are attained by the wire spool with color identification including an axial tube, a first flange extending from a first end of the axial tube, and a second flange extending from a second end of the axial tube. The wire spool is characterized in that the first flange has at least one depression coated with a color layer. The depression has an annular shape, a round shape or a curved shaped. Thus, the color layer is not easy to peel due to collision or attrition and the cost of manufacturing the wire spool can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

FIG 1 is a perspective view of a conventional wire spool.
FIG 2 is a perspective view of another conventional wire spool.
FIG 3 is a sectional view along the 3-3 line in FIG. 2.
FIG 4 is a perspective view of a first preferred embodiment of the present invention.
FIG 5 is a sectional view along the 5-5 line in FIG. 4.
FIG 6 is a sectional view of a second preferred embodiment of the present invention.
FIG 7 is a sectional view of a third preferred embodiment of the present invention.
FIG 8 is a sectional view of a forth preferred embodiment of the present invention.
FIG 9 is a sectional view of a fifth preferred embodiment of the present invention.
FIG 10 is a perspective view of a sixth preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0008] Referring to FIGS. 4-5, a wire spool **10** with color identification in accordance with the first preferred embodiment of the present invention is shown comprising an axial tube **20,** a first flange **30,** a second flange **40** and a color layer **48.** The wire spool **10** is used for winding a bonding wire (not shown) thereon.

[0009] The axial tube **20** is a round tube having a first end **21** and a second end **22** opposite to the first end **21.** The first flange **30** extends radially from the first end **21** of the axial tube **20** and the second flange **40** extends radially from the second end **22** of the axial tube **20.** An annular depression **32** is provided at the middle of the outer wall of the first flange **30.** The axial tube **20,** the first flange **30** and the second flange **40** are made by coating a nickel layer on an aluminum core for conducting electricity, avoiding oxidization of the aluminum core, and reducing manufacture cost. Two notches **34, 44** for orientation are provided respectively at the first flange **30** and the second flange **40.** The depression **32** is coated with a color layer **48.** The way to coat the color layer **48** on the depression **32** is by printing, spraying, baking paint or other method. The color layer **48** is not easy to peel by collision or attrition since the top of the color layer **48** is lower than the outer wall of the first flange **30.** Thus, the color identification function of the wire spool **10** can be prolonged and the tiny particles pollution of the conventional wire spool can be avoided such that the objectives of the present invention can be achieved.

[0010] In practice, the second flange **40** of the wire spool **10** can also be provided with a depression coated with a color later such that both sides of the wire spool have color identification function. The location of the depression **32** has a lot of alternatives. As shown in FIG 6,

a wire spool **50** with color identification in accordance with the second preferred embodiment of the present invention is shown. The outside of the outer wall of the first flange **52** of the wire spool **50** is provided with an annular depression **53** coated with a color layer **54.**

[0011] A wire spool **60** with color identification in accordance with the third preferred embodiment of the present invention is shown in FIG 7. The inside of the outer wall of the first flange **62** of the wire spool **60** is provided with an annular depression **63** coated with a color layer **64.**

[0012] A wire spool **70** with color identification in accordance with the forth preferred embodiment of the present invention is shown in FIG 8. The inside and outside of the outer wall of the first flange **72** of the wire spool **70** is provided respectively with an annular depression **73, 74** each coated with a color layer **75, 76.**

[0013] A wire spool **80** with color identification in accordance with the fifth preferred embodiment of the present invention is shown in FIG 9. The outer wall of the first flange **82** of the wire spool **80** is provided with three annular depressions **83-85** each coated with a color layer **86-88.** The color layers **86-88** each have different color from the other such that the operator can identifies specific bonding wire with different diameter more easily.

[0014] Besides, the shape of the depression has many alternatives, too. For example, the depression has an annular shape in FIGS. 4-9, a curved shape similar to the shape of the color layer **8** in FIG.2, or a round shape in FIG 10. A wire spool **90** with color identification in accordance with the sixth preferred embodiment of the present invention is shown in FIG 10. The outer wall of the first flange **92** of the wire spool **90** is provided with a plurality of round depressions **94** each coated with a color layer **96.**

[0015] In fact, no matter how the shape or the amount of the depression changes, it should be protected by the present invention as long as one of the flanges has at least one depression coated with a color layer. The wire spool can be manufactured by coating a nickel layer on an aluminum core, or made integrally of conductive metal which is uneasy to be oxidized, for instance, Platinum. Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention.

Claims

1. A wire spool (10) with color identification, comprising:

an axial tube (20) having a first end (21) and a second end (22) opposite to the first end (21);
a first flange (30) extending radially from the first end (21) of the axial tube (20); and
a second flange (40) extending radially from the second end (22) of the axial tube (20);

wherein the wire spool (10) is **characterized in that** the first flange (30) has at least one depression (32) coated with a color layer (48).

2. The wire spool (10) with color identification as claimed in claim 1, which is **characterized in that** the depression (32) has an annular shape.

3. The wire spool (10) with color identification as claimed in claim 1, which is **characterized in that** the depression (94) has a round shape.

4. The wire spool (10) with color identification as claimed in claim 1, which is **characterized in that** the depression (32) has a curved shape.

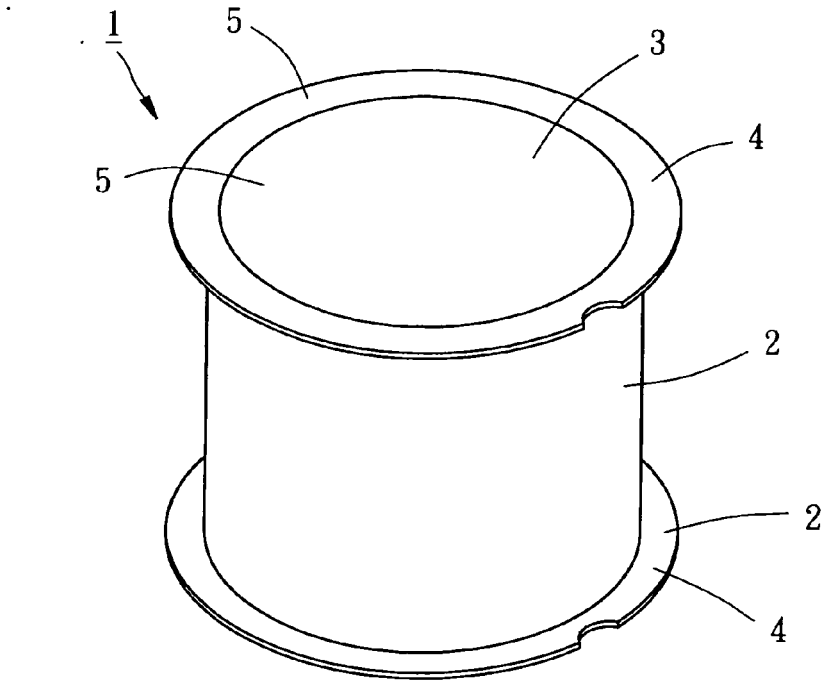

FIG. 1
PRIOR ART

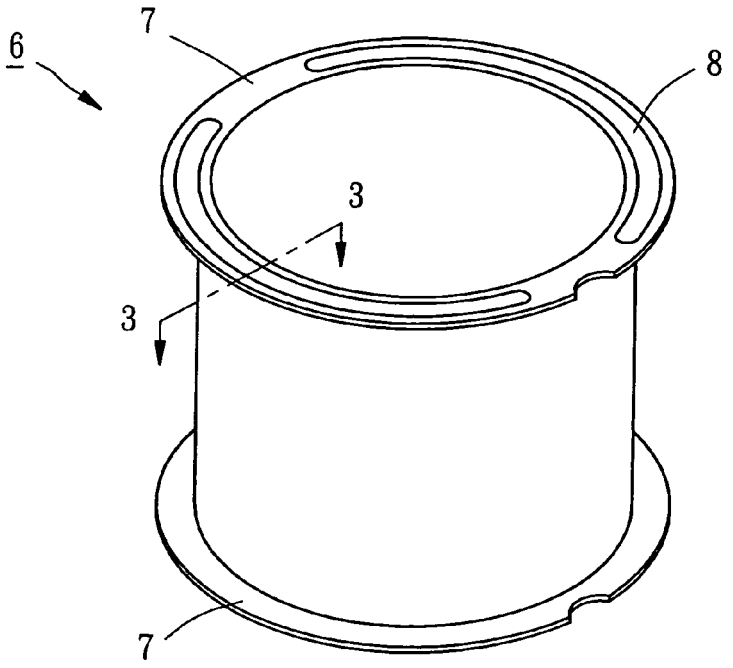

FIG. 2
PRIOR ART

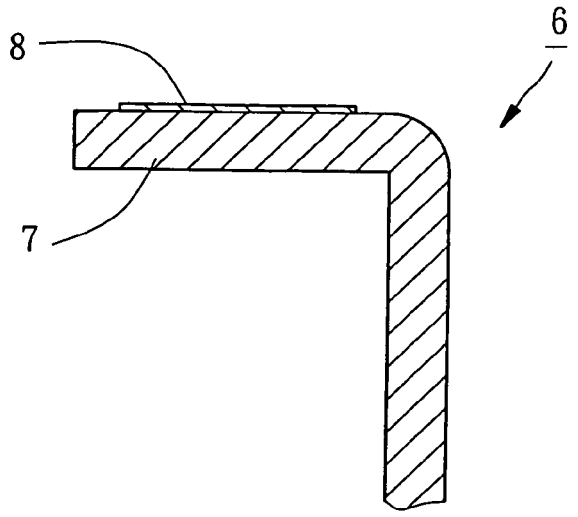

FIG. 3
PRIOR ART

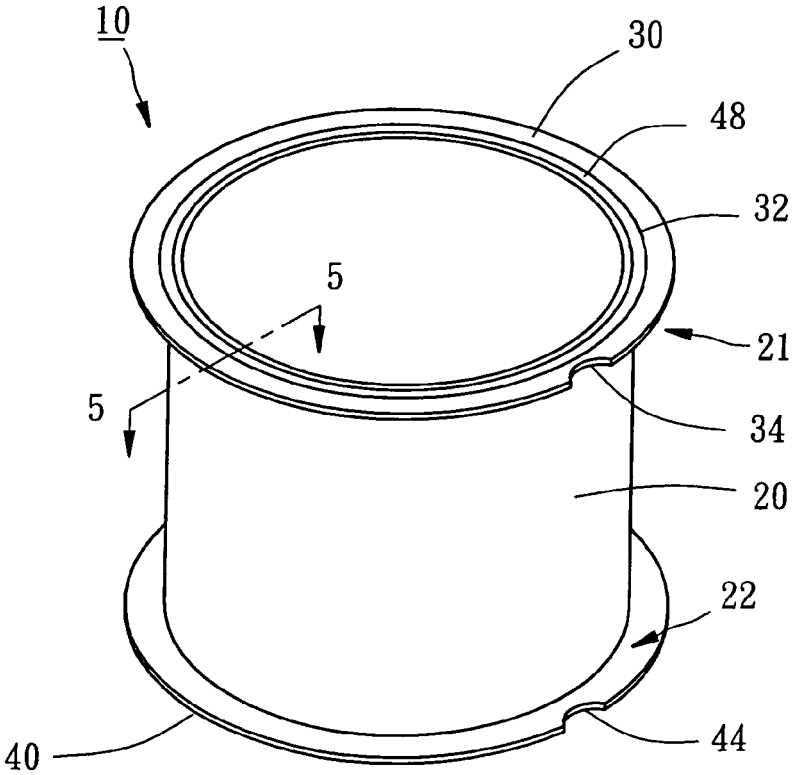

FIG. 4

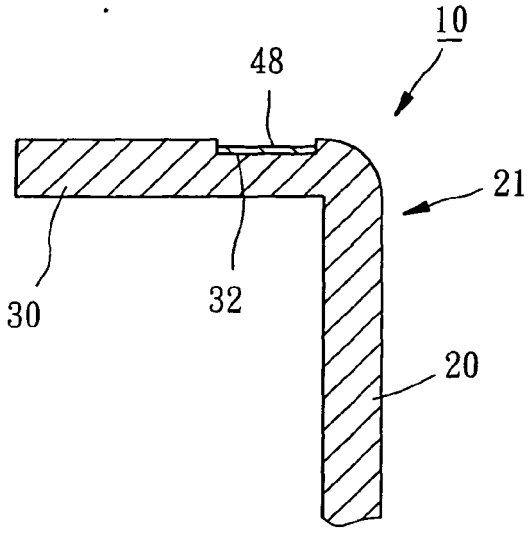

FIG. 5

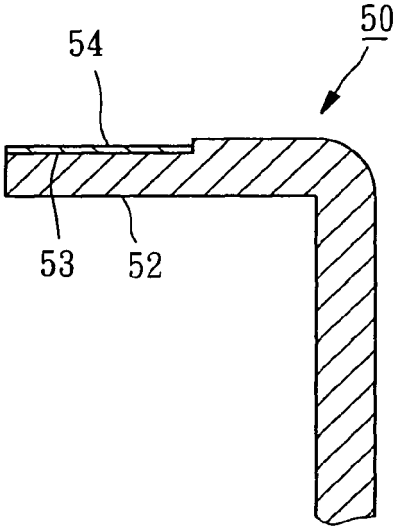

FIG. 6

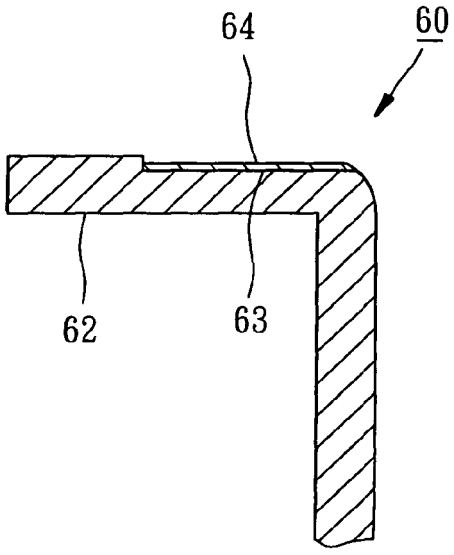

FIG. 7

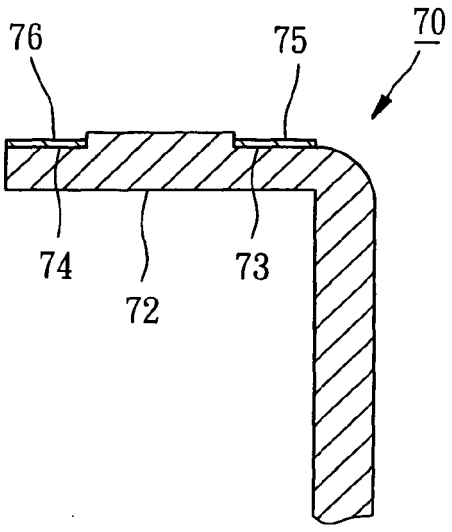

FIG. 8

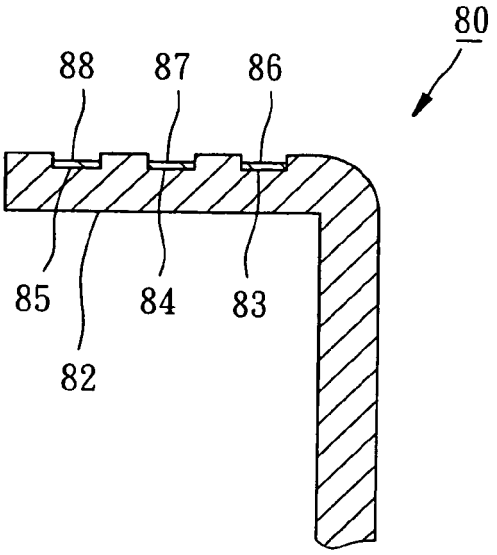

FIG. 9

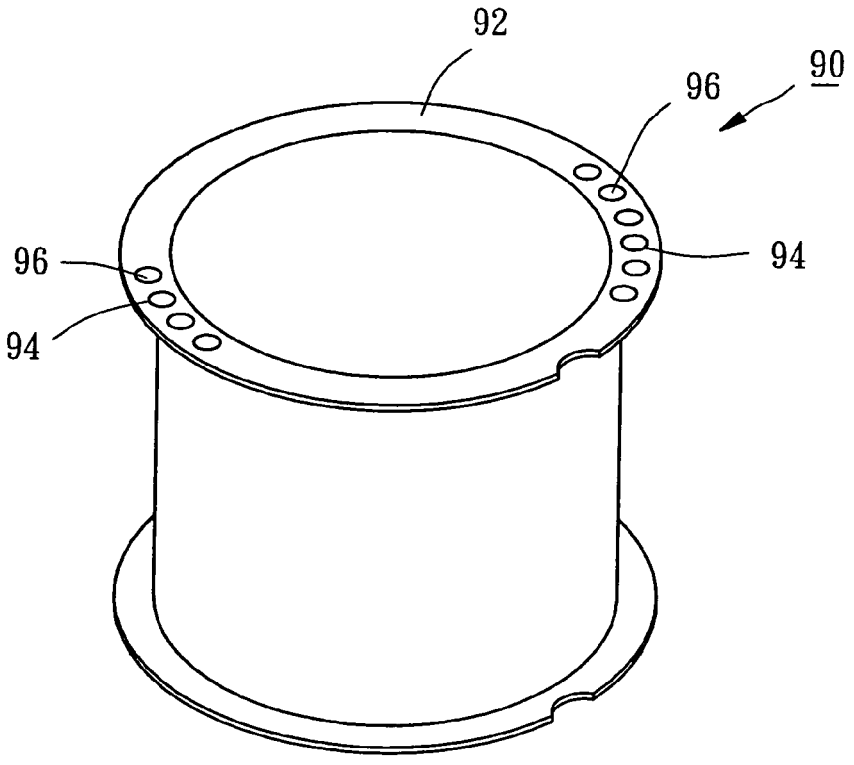

FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 06 01 9162

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2000 185876 A (BRIDGESTONE CORP) 4 July 2000 (2000-07-04) * abstract *	1-4	INV. B65H75/18
X	DE 69 46 879 U (BERKENHOFF & DREBES AG [DE]) 8 July 1971 (1971-07-08) * page 5; claim 12; figures *	1-4	
A	DE 91 15 827 U1 (HAEFNER & KRULLMANN GMBH, 4817 LEOPOLDSHOEHE, DE) 20 February 1992 (1992-02-20) * page 2, line 8 - line 14 * * page 3 - page 4; figures *	1	
A	DE 76 08 715 U1 (METALLGESELLSCHAFT AG, 6000 FRANKFURT) 15 July 1976 (1976-07-15) * page 5, last paragraph; figures *	1	
A	US 2 654 549 A (RAPPLEYEA FREDERICK A) 6 October 1953 (1953-10-06) * column 3, line 20 - line 28; figures *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 February 2007	Lemmen, René

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 01 9162

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06-02-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82