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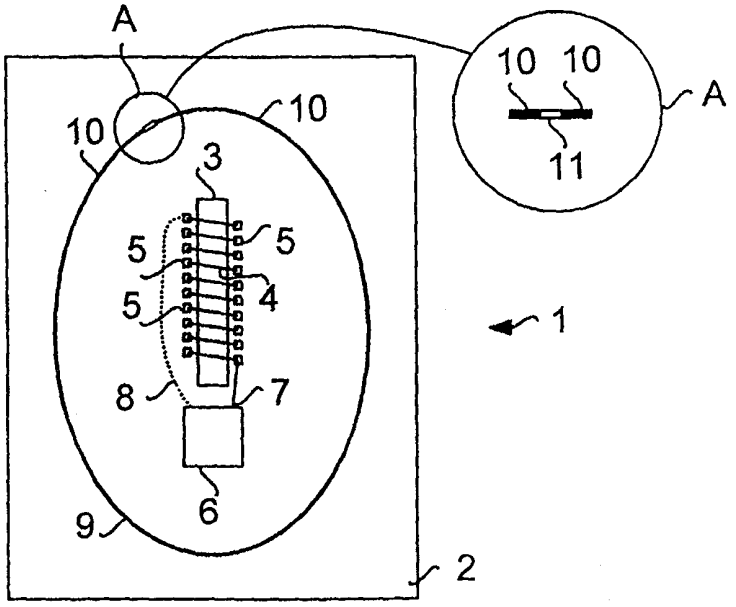
(54) Title: ARTICLE SURVEILLANCE TAG

(57) Abstract

This invention relates to an article surveillance tag which comprises at least one capacitor (6) and a coiled conductor (4), which is connected to said capacitor to form at least one oscillating circuit. To achieve a better than before Q factor and also to provide an article surveillance tag suited for use with metal objects, the article surveillance tag comprises a metal core (3), around which said conductor (4) is coiled.



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ARTICLE SURVEILLANCE TAG

The invention relates to an article surveillance tag utilized in shops and stores for theft prevention. The article surveillance tag is attached to products on sale in shops. When the article surveillance tag is subjected to an electromagnetic field generated by a transmitter of a surveillance gate located at the shop exit, the article surveillance tag causes a change in the electromagnetic field in question. On the basis of this change, the receiver of the gate is able to detect the presence of the article surveillance tag, and the gate alerts the shop personnel.

Article surveillance tags of prior art are made of a thin plastic film, on the surface of which an oscillating circuit of the article surveillance tag is arranged. In a known article surveillance tag, a capacitor is arranged on the film and the electrodes of the capacitor are formed by conductive areas on the opposite surfaces of the film. On the first surface of the film a first conductor is arranged, the first end of which is connected to a first electrode of the capacitor, and the second end of which is connected to a lead-through part extending through the film. On the other side of the film, a second conductor is arranged, the first end of which is connected to a second electrode of the capacitor, and the second end of which is connected to said lead-through part extending through the film. In this article surveillance tag of prior art, at least the first conductor is shaped as a coil which is located on one side of a base. Thus, an oscillating circuit, which comprises at least one capacitor and one coil, is achieved on the film of the article surveillance tag. By altering the dimensions of the capacitor and the coil, the resonance frequency of the oscillating circuit can be made to correspond to the frequency of the electromagnetic field generated by the surveillance gate in the shop, which is typically approximately 8 MHz. This way, the gate in question is able to detect the presence of the article surveillance tag.

The most significant weaknesses of the article surveillance tag described above are its size and poor Q factor (quality factor). It should also be noted that known article surveillance tags are not suitable for protecting metal objects.

It is an object of this invention to solve the problems described above so as to produce an article surveillance tag with a better than before Q factor and which is also suitable for protecting metal objects. This object is

achieved by an article surveillance tag comprising at least one capacitor, a coiled conductor connected to said capacitor to form at least one oscillating circuit, and a metal core, around which said conductor is coiled. The article surveillance tag of the invention is characterized in that the material of said metal core is not electrically conductive.

The invention is based on the idea that when a metal core, around which the conductor is coiled, is used in an article surveillance tag, an article surveillance tag is produced, which has a better Q factor and less loss than article surveillance tags of prior art. The use of a metal core also makes it possible to use the article surveillance tag for marking metal objects, because the direction of the electromagnetic field in relation to the article surveillance tag is different in an article surveillance tag of the invention than in article surveillance tags of prior art. The fact that the core is not electrically conductive provides the additional advantage that the conductor coiled around the core can be in direct contact with the core material. This facilitates the manufacture of the article surveillance tag, because it is not necessary to arrange an insulating layer between the metal core and the conductor coiled around it. In addition, the outer dimensions of the article surveillance tag remain relatively small.

Thus, the most significant advantages of the article surveillance tag of the invention are a better than before Q factor, smaller losses than before, that it can also be utilized with metal objects, and that the article surveillance tag can be made relatively small.

In a first preferred embodiment of the article surveillance tag of the invention, the core of the article surveillance tag is made of a rod-like element, around which a conductor is coiled. The ends of the conductor are connected to a capacitor which is encased together with the core and the coil around it. The casing can be made of a plastic capsule, for instance, which can be attached to a product.

In a second preferred embodiment of the article surveillance tag of the invention, the core is arranged on the surface of a plastic film and a conductor is coiled around the core through openings extending through the film. In this embodiment, the capacitor can be made of conductive areas formed on the opposite surfaces of the film, to which areas the ends of the coiled conductor are connected. This embodiment of the invention enables the manufacture of a very small and flexible article surveillance tag. Thus, the

article surveillance tag can be attached to the product by means of a sticker, such as a price tag.

Preferred embodiments of the article surveillance tag of the invention are disclosed in the accompanying dependent claims 2 to 7.

In the following, the invention will be described in greater detail and by way of example with reference to the accompanying figures, in which

Figure 1 illustrates a first preferred embodiment of the article surveillance tag,

Figure 2 illustrates a second preferred embodiment of the article surveillance tag, and

Figure 3 shows the article surveillance tag of Figure 2 attached to a metal object.

Figure 1 illustrates a first preferred embodiment of the article surveillance tag. Figure 1 shows an article surveillance tag 1 which comprises a base 2 made of a plastic film, the dimensions of which can be 2.0 x 0.4 cm, for instance.

Figure 1 shows the top surface of the base 2 and the components arranged on it. The base 2 comprises a plastic film, on the first surface of which a core 3, with a conductor 4 coiled around it, is arranged. A corresponding second core can, when necessary, also be arranged on the second surface of the base, which is not shown in Figure 1. This way, the article surveillance tag would have two cores separated from each other by the base 2.

On the first surface of the film 2 shown on Figure 1, a conductive area 6 has been arranged to form a first electrode of a capacitor. A second electrode formed by a corresponding conductive area is formed on the second surface of the film (not shown in Figure 1) directly opposite the area 6. Thus a capacitor with electrodes on the opposite surfaces of the film 2 is obtained.

A conductor 4 has been passed through openings 5 extending through the base so as to achieve a continuous coil around the core 3 in the article surveillance tag. The first end 7 of the conductor 4, located on the first surface of the film, is connected to the electrode 6 on the first surface of the film. Correspondingly, the second end 8 of the conductor 4, which is illustrated by a dashed line in Figure 1 and which is located on the second surface of the film, is connected to the second electrode on the second surface of the film. Thus, the coiled conductor 4 and the capacitor form an oscillating circuit. By

means of the dimensions of the capacitor and the conductor, the resonance frequency of the oscillating circuit can be made as required, i.e. it can be 8 MHz, for instance.

The core 3 can be made of metal which has been processed so as not to be electrically conductive. The material in question can be ferrite or a nanomaterial which has been thermally treated, for instance, to produce a crystal structure which is not electrically conductive. The fact that the core is not electrically conductive provides the additional advantage that the conductor coiled around the core can be in direct contact with the core material.

In practice, the core can be manufactured in several alternative ways. The core material can, for instance, be sputtered on a PP plastic film as 10 nm thick nickel layers. For instance, 10 layers can be used. In such a case, aluminium oxide or a plastic film is suitable as insulating material. This produces a core material which is magnetically advantageous, but not electrically conductive, so no circulating currents are generated.

A second alternative to manufacture the core is to press ferrite (Fe_2O_3) rods together under great pressure, after which the mass created is sintered and thermally treated to produce the required final result. This technique corresponds to that used in manufacturing ferrite rods for radio receivers.

A third alternative to manufacture the core is to use a melted alloy (Fe 70%, Mg 25%, C 4% and Al 1%) which is cooled so quickly that the crystal structure does not have time to become electrically conductive. In this alternative, the melted mixture of approximately 2,000°C is poured on a CU drum of approximately 270°C rotating 10,000 rounds per minute, whereby the mixture cools down at a rate of approximately 1 million degrees a minute. A banded material is produced on the drum and a piece suitable for the core can be cut from it and glued on the plastic base of the article surveillance tag.

The conductor 4 and the capacitor electrodes 6 of the article surveillance tag 1 can be built up with copper on the surfaces of the film 2 using a technique known from manufacturing circuit boards. In such a case, the film 2 is preferably made of plastic, both surfaces of which are covered with sputtered aluminium. The thickness of the aluminium layers can be 5 to 10 nm. The shapes of the sensor components are printed on the surface of the aluminium with protective varnish. Excess aluminium is discharged by etching

so that only the aluminium under the printed shape remains. After this, the protective varnish is removed from the surface of the remaining aluminium with acetone, for instance, after which the building up of the components with copper can be started. The thickness (aluminium layer + copper layer) of the conductor 4 of the article surveillance tag can be 10 to 20 μm, for instance, and the width of the conductor 4 can be 100 to 200 μm, for instance.

A short-circuiting ring 9, which is used in activating the sensor, is also arranged in the article surveillance tag 1 of Figure 1. The short-circuiting ring 9 is made of a conductor 10 formed on the first surface of the film 2, which conductor surrounds the components in the oscillating circuit of the article surveillance tag. The short-circuiting ring can be manufactured with a technique corresponding to that used with the conductor 4. Practice has shown that the short-circuiting ring prevents the 8 MHz frequency from showing in the surveillance gate as long as the ring is intact. In other words, even though the resonance frequency of the oscillating circuit of the article surveillance tag is 8 MHz, the surveillance gate, which generates an electromagnetic field of the frequency is question, does not detect an article surveillance tag which has an intact short-circuiting ring 9.

Activation of the article surveillance tag of Figure 1 (so that the surveillance gate is able to detect it) is done by cutting the short-circuiting ring with an electromagnetic field whose frequency is approximately 100 kHz. To facilitate this, the short-circuiting ring has a reduction 11 which is illustrated in greater detail in Enlargement A of Figure 1.

Enlargement A shows that the conductor 10 of the short-circuiting ring 9 is thinner at the reduction point 11, which means that the conductor can be burnt through with a relatively weak electromagnetic field. The difference in thickness can be achieved by not removing the protective varnish at the reduction point 11, when the components of the article surveillance tag are being built up on the aluminium layer on the surface of the base. Thus, copper does not fasten to the reduction point, and only a conductor as thick as the aluminium layer remains. When the building up of the conductor by means of copper is finished, the varnish can be removed from the reduction point 11. A conductor section having a thickness of the earlier mentioned 5 to 10 nm remains at the reduction point, whereas the thickness of the conductor 10 is 10 to 20 μm elsewhere.

Departing from the case in Figure 1, a reduction 11 corresponding

to that of the short-circuiting ring 10 can also be formed in the conductor in the oscillating circuit of the article surveillance tag 1. Such a reduction can, for instance, be formed at the joint of the end 7 of the conductor 5 and the electrode 6. If the thickness of the conductor is generally 10 to 20 μm, for instance, its thickness at the reduction point can be 5 to 10 nm, for instance. This way, the article surveillance tag can be deactivated when the product to which it is attached has been sold. Deactivation is done by subjecting the article surveillance tag to an electromagnetic field whose frequency corresponds to the resonance frequency of the oscillating circuit in the article surveillance tag, but whose magnitude is clearly higher than that used in the surveillance gate.

Figure 2 illustrates a second preferred embodiment of the article surveillance tag. The core 3' of the article surveillance tag in Figure 2 is made of a rod-like element, around which a conductor 4' is coiled. The core 3' can be made of the same material as the core of the article surveillance tag in Figure 1, i.e. it can be of metal which is processed so that it is not electrically conductive.

The ends of the conductor 4' are connected to the capacitor 11'. This can be a conventional, commercially available capacitor component.

The core 3', the conductor 4', and the capacitor 11' are, in the case of Figure 2, encased in a plastic capsule 12'. The capsule in question can be attached directly to the product.

Figure 3 shows the article surveillance tag 1' of Figure 2 attached to a metal object 13'. The object can be an aluminium beverage can, for instance.

Figure 3 illustrates the electromagnetic field generated by the surveillance gate with arrows F. Figure 3 shows that due to the structure of the article surveillance tag, the electromagnetic field can pass through the loops 4' of the coil in the direction of the core. Thus, the sensor can be detected even when attached to a metal object. In article surveillance tags of prior art, the field cannot pass through the loops of the sensor coil, because in article surveillance tags of prior art, the loops are arranged in one layer only on the surface of the article surveillance tag base, after which the sensor is attached to the product so that its surface is against the surface of the metal object. In article surveillance tags of prior art, the surface of the metal object thus prevents the electromagnetic field from passing through the loops of the article

surveillance tag coil.

It will be understood that the description above and the related figures have been presented for the purpose of illustrating the present invention. Various variations and modifications of the invention will be obvious to a person skilled in the art without departing from the scope and spirit of the invention disclosed in the accompanying claims.

CLAIMS

1. An article surveillance tag comprising at least one capacitor (6, 11'), a coiled conductor (4, 4') connected to said capacitor to form at least one oscillating circuit, and a metal core (3, 3'), around which said conductor is coiled, **characterized** in that the material of said metal core (3, 3') is not electrically conductive.

2. An article surveillance tag as claimed in claim 1, **characterized** in that said conductor is coiled directly on the surface of said core.

3. An article surveillance tag as claimed in claim 1 or 2, **characterized** in that the material of said metal core (3, 3') is ferrite or a nanomaterial and that the material of the metal core is thermally treated so as to produce a crystal structure which is not electrically conductive.

4. An article surveillance tag as claimed in any one of the claims 1 to 3, **characterized** in that said metal core (3') is made of a rod-like element, around which the conductor (4') is coiled.

5. An article surveillance tag as claimed in any one of the claims 1 to 3, **characterized** in that

the article surveillance tag comprises a thin, flat, elastic base (2) with the metal core (3) arranged on one of its surfaces,

said capacitor consists of conductive areas (6) which are formed on opposite surfaces of the base, are of substantially equal size and shape, and are separated from each other by the base (2),

the base (2) has openings (5) extending through the base on opposite sides of the metal core (3), and

said conductor (4) is coiled through the openings (5) so that the conductor surrounds the metal core (3), and the ends (7, 8) of the conductor are connected on opposite sides of the base to the conductive areas (6) of the capacitor.

6. An article surveillance tag as claimed in claim 5, **characterized** in that at least on one surface of the base (2) a short-circuiting ring (9) is arranged surrounding the core (3), the conductive area (6) of the capacitor, and the conductor (4) coiled around the core, which ring consists of a conductor (10) arranged on the surface of the base (2), to which conductor a reduction (11) is made, at which the short-circuiting ring can be

cut allowing the article surveillance tag to be activated by cutting the short-circuiting ring by subjecting the article surveillance tag to an electromagnetic field having a predefined field strength and predefined frequency, which frequency differs from the resonance frequency of the oscillating circuit in the article surveillance tag.

7. An article surveillance tag as claimed in claim 5 or 6, **characterized** in that

the conductive areas (6) of said capacitor, said conductor (4) and said short-circuiting ring (9) consist of an aluminium layer having a thickness of approximately 5 to 10 nm formed on the surface of the base (2) and of a copper layer formed on the aluminium layer making the thickness of the conductive areas, conductor, and short-circuiting ring approximately 10 to 20 μm, and

a reduction (11) is arranged in said conductor (4) and/or short-circuiting ring (9), at which reduction, the conductor and/or short-circuiting ring consists of said aluminium layer only.

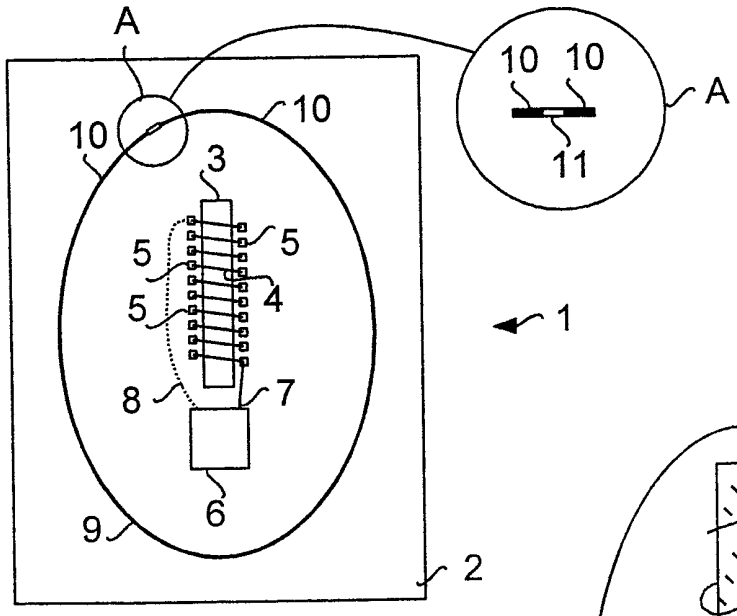

FIG. 1

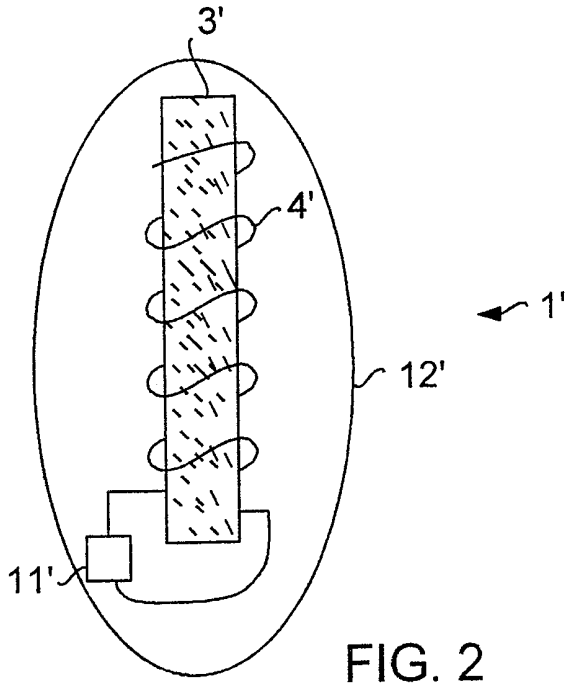

FIG. 2

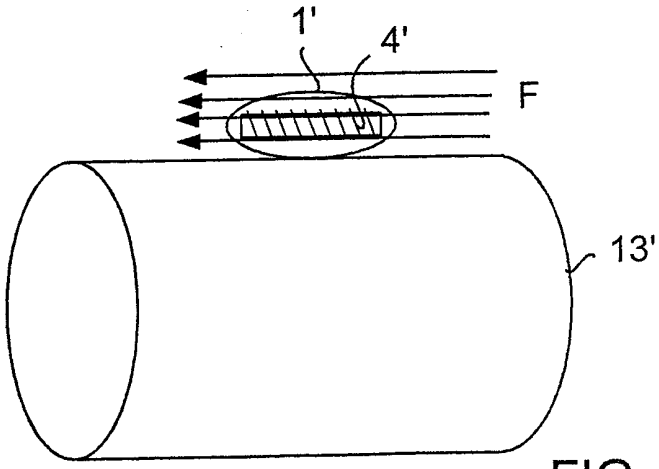

FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G08B 13/24
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G08B, G01V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4654641 A (L.G. FERGUSON ET AL.), 31 March 1987 (31.03.87), column 3, line 39 - line 66, figure 1, abstract	1,2,4
Y	--	3
Y	US 5496611 A (T. IKEDA ET AL.), 5 March 1996 (05.03.96), column 4, line 37 - line 58	3
A	-- EP 0215605 A2 (MINNESOTA MINING AND MANUFACTURING COMPANY), 25 March 1987 (25.03.87), page 4, line 21 - page 5, line 27, abstract	1-7
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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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PCT/FI 99/00784

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5576693 A (C. TYREN ET AL.), 19 November 1996 (19.11.96), column 1, line 39 - column 3, line 43, abstract --	1-7
A	"Introduction to Magnetism and Magnetic Materials", Second Edition, 1998, David Jiles, pages325-361, see chapter 12 -- --------	1,3,4

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No. PCT/FI 99/00784

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4654641 A	31/03/87	AT 73247 T	15/03/92
		DE 3684072 A	09/04/92
		EP 0216584 A,B	01/04/87
		SE 0216584 T3	
		ES 2002150 A	16/07/88
		JP 2561249 B	04/12/96
		JP 62115385 A	27/05/87
		NO 173678 C	12/01/94
		NO 863641 D	00/00/00
		US 4727360 A	23/02/88
US 5496611 A	05/03/96	JP 6282229 A	07/10/94
		US 5597653 A	28/01/97
EP 0215605 A2	25/03/87	SE 0215605 T3	
		AU 583936 B	11/05/89
		AU 6051786 A	12/03/87
		CA 1261936 A	26/09/89
		ES 2001939 A	01/07/88
		HK 64491 A	23/08/91
		JP 2758896 B	28/05/98
		JP 62060095 A	16/03/87
		MX 166576 B	20/01/93
		SG 61391 G	23/08/91
		US 4745401 A	17/05/88

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No. PCT/FI 99/00784

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5576693 A	19/11/96	AT 145472 T	15/12/96
		AT 145742 T	15/12/96
		AT 160892 T	15/12/97
		AT 178731 T	15/04/99
		AU 3413593 A	03/08/93
		AU 3413693 A	03/08/93
		AU 3651893 A	03/08/93
		CA 2128431 A	22/07/93
		CA 2128432 A	22/07/93
		CA 2128433 A	22/07/93
		DE 69306101 D,T	03/04/97
		DE 69306245 D,T	03/04/97
		DE 69315559 D,T	02/04/98
		DE 69324348 D	00/00/00
		EP 0623237 A,B	09/11/94
		SE 0623237 T3	
		EP 0624241 A,B	17/11/94
		SE 0624241 T3	
		EP 0626666 A,B	30/11/94
		SE 0626666 T3	
		EP 0627106 A,B	07/12/94
		SE 0627106 T3	
		ES 2096272 T	01/03/97
		ES 2096277 T	01/03/97
		ES 2112413 T	01/04/98
		JP 7503066 T	30/03/95
		JP 7503085 T	30/03/95
		JP 7503344 T	06/04/95
		SE 469673 B,C	16/08/93
		SE 9200145 A	21/07/93
		SE 9203258 A	21/07/93
		SE 9203479 A	21/07/93
		US 5551158 A	03/09/96
		US 5557085 A	17/09/96
		WO 9314370 A	22/07/93
		WO 9314474 A	22/07/93
		WO 9314478 A	22/07/93
		SE 9300036 D	00/00/00