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(54) **AN ARTICLE SURVEILLANCE TAG**

SICHERUNGSETIKETT FÜR DIE WARENÜBERWACHUNG

ETIQUETTE DE SURVEILLANCE D'ARTICLE

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(73) Proprietor:
TUOTESUOJA SIRPA JÄRVENSIVU OY
37800 Toijala (FI)

(72) Inventor: **SEPPÄ, Heikki**
FIN-00370 Helsinki (FI)

(74) Representative:
Holmström, Stefan Mikael et al
Oy Kolster Ab,
Iso Roobertinkatu 23,
P.O. Box 148
00121 Helsinki (FI)

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EP-A- 0 280 361 **US-A- 3 810 147**
US-A- 4 598 276 **US-A- 4 694 283**

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Description

[0001] The invention relates to an article surveillance tag comprising a thin, planar, elastic substrate on both sides of which are arranged components made from flexible material, the components joining to form at least one oscillatory circuit comprising a first and a second capacitor whose electrodes are formed by conducting regions on opposite sides of the substrate such that the electrodes on the opposite sides of the substrate are essentially in alignment and of the same size; a first pair of conductor branches, the branches being arranged on the opposite sides of the substrate, their first ends being connected to the electrodes of the first capacitor, and at least one of the conductor branches being shaped as a coil; a second pair of conductor branches, the branches being arranged on opposite sides of the substrate, their first ends being connected to the electrodes of the second capacitor, and at least one of the conductor branches being shaped as a coil; and the second ends of the conductor branches located on a first side of the substrate are connected to a lead-through part or to a first electrode of a third capacitor by means of a common conductor branch section.

[0002] The invention relates to a tag attached to or integrated into packages, stickers, labels or the like for preventing thefts in shops and stores, the tag comprising an oscillatory circuit formed by a capacitor and a coil. When an object containing an article surveillance tag is subjected to an electromagnetic field of an Electronic Detection System (EAS) generated by the transmitter of the system and the antenna connected thereto, the article surveillance tag generates a change in the field. On the basis of the change, the receiver of the surveillance system detects the presence of the tag. The transmitter and receiver of the surveillance system are positioned in a place or places where they hopefully detect unauthorized removal of an article provided with a tag, e.g. at the exit of a shop.

[0003] Article surveillance tags are usually made from a thin plastic foil coated on both sides with a metal foil. On the metal foils is transferred ink preferably by using gravure techniques. The metal is then etched in those points where there is no ink. In the end, the ink is removed.

[0004] The components of the article surveillance tags are usually dimensioned such that the resonance frequency of the tags, i.e. the detection frequency, is about 8.2 MHz. The resonance frequency of the tags should be independent of temperature, metal objects and touch. In addition, the tag should be as inexpensive and small as possible, so that it is easy to attach to all kinds of surfaces. This is achieved by producing a tag with a minimum surface area from a material with a minimum thickness. The quality factor (Q-factor) and surface area of the resonator, however, are the decisive factors in the detection of the tag. In other words, if the tag has a small surface area, its quality factor must be

as high as possible.

[0005] Previously known are, for instance from US-3,810,147, article surveillance tags in which a resonance circuit without a lead-through part is formed on a thin foil from a capacitor and conductor branches, at least one of which is shaped as a coil. In known tags, a coil located on one side of the foil may comprise several turns, but on the other side only a few turns can usually be provided. The number of turns cannot be increased without that the stray capacitance between the lower and the upper coil tunes the resonance circuit.

[0006] It must also be possible to deactivate or destroy the article surveillance tag easily, so that a person who has actually purchased an article to which a tag is attached does not give an unnecessary alarm as he leaves the shop.

[0007] Previously known article surveillance tags are described e.g. in U.S. Patent 5,241,299 and Finnish Patent Application 920,695. In these publications, the article surveillance tag is deactivated by subjecting the tag at a resonance frequency to an electromagnetic field having a certain minimum strength. The induced voltage generated between the plates of the capacitor then causes a dielectric breakdown at the plates, whereby the capacitor short-circuits. To facilitate the breakdown, a hollow or weaker point is provided in the above publications in the dielectric material between the plates of the capacitor.

[0008] The major drawback of the above-mentioned known solutions is that the dielectric material must have certain specified characteristics in order that it might be possible to make sure that the capacitor short-circuits. In addition, either there must be a weaker point in the dielectric material or the dielectric material layer between the plates must be dimensioned very carefully to make sure that the capacitor short-circuits. These requirements increase the raw material and/or production costs of the article surveillance tag.

[0009] Previously known is also an article surveillance tag whose deactivation is based on the breaking of a conductor branch in the resonance circuit. In this known solution, a special weaker point is provided in the conductor branch; the conductor branch breaks at this point when the article surveillance tag is subjected at a resonance frequency to an electromagnetic field having a certain minimum strength. One such article surveillance tag is known from WO Patent Application 93/01571. The maximization of the quality factor, or Q-value, of the article surveillance tag, however, requires that the width of the conductor has been minimized (100 to 200 μm). It is then very difficult and expensive to provide an even narrower weaker point in the conductor so as to concentrate the power on one point when the tag is deactivated. An addition of a separate resistive point would also raise the price of the article.

[0010] The object of the present invention is to solve the above problems and to provide an article surveillance tag which is relatively cheap and simple to pro-

duce; which can be easily and reliably detected by EAS equipment; which is small in size; and which can be easily deactivated. These objectives are achieved with the tag described in the invention, which is characterized in that the second ends of the conductor branches located on a second side of the substrate are separately from each other attached to said lead-through part or to a second electrode of said third capacitor to provide an oscillatory circuit.. Here the term 'electrically connected' means that the second ends of the conductor branches are connected to one another e.g. galvanically or capacitively so that a combined electric effect necessary for the operation of the resonance circuit is produced between them.

[0011] The basic idea of the invention is that when the resonator circuit of the tag is formed by a plurality of parallel coils, the surface area of the tag can be effectively utilized in its entirety. The coils are placed in parallel such that the area between the coils connected in parallel forms a gradiometer so that no current is induced therein from the homogenous field. The quality factor of the article surveillance tag is thus maintained high.

[0012] In one advantageous embodiment, the parallel conductor branches are combined in at least one point to form one common conductor branch section. This renders the total current of the resonator circuit in the common conductor branch section high, whereby the conductor branch section is easily broken and the tag deactivated. Since the deactivation of the article surveillance tag according to the invention does not require short-circuiting of the capacitor electrodes as in the known solutions, one step is eliminated from the production of the tag, i.e. the thinning of the foil between the electrodes. This naturally lowers the production costs. Also, a cheaper foil material can be used in the article surveillance tag described in the present invention.

[0013] The current in the branch section that is common to the conductor branches consists of the total current of the separate conductor branches. The number of parallel coils, the number of capacitors, and the number of turns in the coil can naturally vary with the field of use. When parallel coils are used, however, it is important that each coil has approximately the same current. According to the invention, this is achieved by connecting the second ends of the coils located on the same side of the foil.

[0014] The number of coils in one tag is advantageously between 2 and 8. The number of turns in the coils is advantageously between 2 and 4.

[0015] Thus the major advantages of the article surveillance tag described in the invention are that the quality factor of the resonance circuit can be maximized owing to the very thin conductor branches which need not be separately thinned to deactivate the tag, that the surface of the tag can be efficiently covered by coils while maintaining the inductance of the resonator small, since the coils are placed in parallel, and that due to the

low inductance, the capacitance is great, whereby the voltage level remains low and the tag is not touch-sensitive. The current is also high, which makes it possible to destroy the tag with current.

[0016] When the surface area is sufficiently large and the plastic foil of the tag is sufficiently thin, both surfaces of the tag can be effectively utilized by using double-layer coils with turns on different sides of the foil. Since the inductance is low, the voltage between the coils on different sides of the foil is low, and the excess capacitance caused by overlapping, which reduces the Q-value of the tag, can be controlled.

[0017] The advantageous embodiments of the article surveillance tag according to the invention appear from attached dependent claims 2 to 5.

[0018] In the following the invention will be described in greater detail by means of some advantageous embodiments of the article surveillance tag according to the invention and with reference to the attached drawings, in which

Fig. 1 illustrates a first advantageous embodiment of an article surveillance tag according to the invention,

Fig. 2 shows a connecting pattern for a second advantageous embodiment of the tag according to the invention,

Fig. 3 illustrates the structure of the article surveillance tag according to the pattern of Fig. 2,

Fig. 4 illustrates a third advantageous embodiment of the article surveillance tag according to the invention, and

Fig. 5 illustrates a fourth advantageous embodiment of the article surveillance tag according to the invention.

[0019] Fig. 1 illustrates a first advantageous embodiment of an article surveillance tag according to the invention. The surface area of the tag shown in Fig. 1 is advantageously from about 5 to 10 cm². The tag is produced in a manner known per se by laminating a thin metal foil on both sides of a thin plastic foil 5 and subsequently etching the excess metal.

[0020] The tag shown in Fig. 1 comprises three capacitors C1, C2 and C3. The electrodes of these capacitors are formed by conducting regions of essentially the same size provided on opposite sides of the foil essentially in alignment with one another and separated by the foil 5. The electrodes of capacitors C1, C2, C3 are advantageously formed by a plurality of superposed strips, whereby whirling currents can be minimized and the quality factor of the tag thereby improved.

[0021] The capacitor electrodes on the same side of the foil 5 are connected to one another by means of conductor branches. In Fig. 1, a conductor branch 1, which is shaped as a coil, connects the electrodes of capacitors C1 and C2 above the foil 5, and a conductor branch 2, which in Fig. 1 is indicated by a dotted line,

connects the electrodes of capacitors C1 and C2 below the foil 5. A conductor branch 4, which is also indicated by a dotted line, connects the electrodes of capacitors C1 and C3 below the foil 5. The conductor branches are about 100 to 200 μm in width.

[0022] Fig. 1 shows that one end of a conductor branch 3 shaped as a coil is connected to the electrode of capacitor C3 above the foil 5, and that the other end of conductor branch 3 is connected to conductor branch 1 so that conductor branches 1 and 3 are partly formed by one common conductor X. The article surveillance tag shown in Fig. 1 thus comprises two coils 1 and 3 connected in parallel. The utilization of a plurality of coils connected in parallel makes it possible to utilize the surface of the tag efficiently without that the inductance of the resonator increases. When the inductance is low, the capacitance is correspondingly higher (the resonance frequency of the resonator circuit depends on the product of inductance and capacitance). High capacitance leads to a low voltage level, whereby the tag is not touch-sensitive.

[0023] When the article surveillance tag of Fig. 1 is subjected to an electromagnetic field at a resonance frequency of 8.2 MHz, current is generated in coils 1 and 3. Since coils 1 and 3 are combined at the conductor branch section X, the current in the common section X is the sum of the currents of coils 1 and 3. The power in the common section can be calculated by the formula $P=I^2 \cdot R$, I representing the sum of the currents of the separate conductor branches and R representing resistance. The power per one length unit of the common conductor branch section X is thus proportional to the power of two of the number of coils, or conductor branches. In the invention, this is utilized in the deactivation of the article surveillance tag.

[0024] If the series resistance of the coil is R, then effective current $I = 2\pi fAB / R$ is induced in the coil in resonance, B representing the effective value of the density of the magnetic flux, A representing the surface area of the tag, and f representing the frequency. When current is used for 'destroying', the surface area of the tag should be as large as possible and the series resistance R of the coil should be minimal. This favours solutions with many parallel conductors and only a few turns in a series. The optimization of the quality factor Q of the tag has the same effect as the minimization of R.

[0025] The article surveillance tag of Fig. 1 is deactivated at its resonance frequency by subjecting it to an electromagnetic field whose strength exceeds a certain minimum value. The power generated in the conductor X is then so high that the conductor breaks. To facilitate deactivation, the common conductor branch section X can be made from some other material than the other sections of the resonance circuit. A suitable material for the purpose is a material whose resistance increases abruptly as the temperature rises. Such materials include e.g. carbonous mixtures and zinc-dioxide. When this kind of material is used, lower power is needed for

breaking the conductor X.

[0026] Fig. 2 shows a connecting pattern for a second advantageous embodiment of the tag according to the invention. The tag shown in Fig. 2 is very similar to the tag of Fig. 1, but it comprises four capacitors C1 to C4 and six conductor branches 10 to 15 shaped as coils. The dotted line between the electrodes of the capacitor stands for the plastic foil 5 that separates the components above and below from one another.

[0027] Fig. 2 shows that the second ends of conductor branches 11, 13 and 15 below the foil 5 are connected to an electrode 16 of capacitor C1. The second ends of conductor branches 10, 12 and 14 above the foil 5, on the other hand, are connected through the common conductor branch section X to electrode 17 of capacitor C1 located above the foil. Conductor branch section X thus breaks fairly easily as the resonator is deactivated, as described above.

[0028] In Fig. 2, the lower conductor branches cross one another, which illustrates that the outermost 10 parallel coil above becomes the innermost 11 below, etc. (cf. Fig. 3).

[0029] Fig. 3 illustrates the structure of the article surveillance tag shown in Fig. 2. In Fig. 3, conductor branches 10, 12 and 14 above the foil 5 are indicated by continuous lines, and conductor branches 11, 13 and 15 below the foil are indicated by dotted lines. For example, the electrodes of capacitors C1 and C2 above the foil are thus connected by conductor branch 10, which is shaped as a coil. Similarly, the electrodes of capacitors C1 and C2 below the foil are connected by conductor branch 11. The electrodes below foil 5 are in alignment with and of the same size as the electrodes above the foil.

[0030] In the tag of Fig. 3, the coils connected in parallel are arranged such that a loop between two parallel coils does not generate short-circuit current in a homogenous field and thereby lower the quality factor Q of the tag. The coils of Fig. 3 are arranged in parallel such that the area between the coils connected in parallel forms a gradiometer, whereby no current is induced therein from the homogenous field. The quality factor of the article surveillance tag is thus rendered high. This structure requires the use of a plurality of separate capacitors. The conductor branches of Fig. 3 are arranged in such a way that the parallel coil that is the outermost 10 above becomes the innermost 11 below, etc. In other words, the conductor branches are of equal length. This structure makes it possible to utilize both sides of the foil to the full without that it leads to an increase in the stray capacitance and thereby to a decrease in the Q-value.

[0031] If desired, conductor branches and capacitors needed for activating an article surveillance tag can be added to the tag of Fig. 3. The activation is then advantageously conducted in a manner known per se at a frequency that is higher than the detection frequency of the tag. The activation can be carried out e.g. by

breaking one of the conductor branches of the tag by burning so that the resonance frequency of the resonance circuit changes to the detection frequency.

[0032] Fig. 4 illustrates a third advantageous embodiment of the article surveillance tag according to the invention. The article surveillance tag of Fig. 4 is very similar to that of Fig. 3, i.e. it comprises a foil 5 on the opposite sides of which are arranged conductor branches 10, 11, 12, 13, 14 and 15 connected in parallel and shaped as coils. In Fig. 4, as in Fig. 3, the conductor branches below the foil 5 are indicated by dotted lines.

[0033] The tag of Fig. 4, like the tag of Fig. 3, comprises four capacitors C1, C2, C3 and C4. In Fig. 4, however, all capacitors of the tag are arranged on the inside of the coils to maximize the surface area of the capacitors. In this embodiment, there may be up to ten parallel conductor branches, advantageously 5 to 10. The tag of Fig. 4 does not comprise a separate breaking point, although it is possible to provide such a point in the tag in the same way as in the tag of Fig. 3.

[0034] Fig. 5 illustrates a fourth advantageous embodiment of the article surveillance tag according to the invention. The article surveillance tag shown in Fig. 5 is very similar to the tag of Fig. 3. In the embodiment of Fig. 5, however, one of the capacitors is replaced with a lead-through part 18. In Fig. 5, the lead-through part projects through the foil 5 such that it connects conductor branches 10, 12 and 14 located above the foil 5 to conductor branches 11, 13 and 15 located below the foil. The shape or size of the lead-through part 18 can vary, as long as it ensures such a galvanic connection between the ends of the conductor branches on the opposite sides of the foil that is sufficient to the operation of the resonator circuit.

[0035] In Fig. 5, the lead-through part 18 is spaced from the edges of the foil 5. For this, the foil 5 is perforated during the production to provide the lead-through part. However, the lead-through part 18 can also be arranged 'outside' the foil, i.e. at its outer edge, whereby the foil need not be perforated. Conductor branches 10 to 15 then extend to the outer edge of the foil 5, where they combine with the lead-through part 18.

[0036] In the article surveillance tag of Fig. 5 there is provided a breaking point in the same way as in Fig. 3, i.e. conductor branches 10, 12 and 14 located above the foil are connected to the lead-through part 18 by a common conductor branch section X. If a breaking point is not needed, the article surveillance tag of Fig. 5 can be altered such that conductor branches 10, 12 and 14 above the foil are connected to the lead-through part 18 in the same way as conductor branches 11, 13 and 15 below the foil 5, i.e. individually.

[0037] It is to be understood that the above description and the figures associated therewith are only intended to illustrate the present invention. It is obvious to one skilled in the art that the invention can be varied and modified in many ways without deviating from the scope of the invention disclosed in the attached claims.

Claims

1. An article surveillance tag comprising a thin, planar, elastic substrate (5) on both sides of which are arranged components made from flexible material, the components joining to form at least one oscillatory circuit comprising

a first and a second capacitor (C2, C3) whose electrodes are formed by conducting regions on opposite sides of the substrate such that the electrodes on the opposite sides of the substrate are essentially in alignment and of the same size;

a first pair of conductor branches (1, 2; 10, 11), the branches being arranged on the opposite sides of the substrate (5), their first ends being connected to the electrodes of the first capacitor (C2), and at least one of the conductor branches (1; 10, 11) being shaped as a coil;

a second pair of conductor branches (3, 4; 12, 13), the branches being arranged on opposite sides of the substrate (5), their first ends being connected to the electrodes of the second capacitor (C3), and at least one of the conductor branches (3; 12, 13) being shaped as a coil; and

the second ends of the conductor branches (1, 3; 10, 12, 14) located on a first side of the substrate are connected to a lead-through part (18) or to a first electrode (17) of a third capacitor (C1) by means of a common conductor branch section (X),

characterized in that

the second ends of the conductor branches (2, 4; 11, 13, 15) located on a second side of the substrate are separately from each other attached to said lead-through part (18) or to a second electrode (16) of said third capacitor (C1) to provide an oscillatory circuit.

2. The article surveillance tag according to claim 1, **characterized** in that both branches (10, 11; 12, 13; 14, 15) of the first and/or second pairs of conductor branches are shaped as coils.
3. The article surveillance tag according to any one of claims 1 to 2, **characterized** in that both branches of the first and second pairs of conductor branches (10, 11; 12, 13) are shaped as coils, those branches (10, 12) of the first and second pairs of conductor branches which are located on the same side of the substrate (5) being arranged in parallel so that if that branch (10) of the first pair of conductor branches which is above the substrate (5) is the outermost, that branch (11) of the first pair of conductor branches which is below the substrate (5) is the innermost.

4. The article surveillance tag according to any one of claims 1 to 3, **characterized** in that the conductor branches (1 to 4; 10 to 15) are about 100 to 200 μm in width.
5. The article surveillance tag according to any one of claims 1 to 4, **characterized** in that the surface area of the tag is about 5 to 10 cm^2 and the thickness of the tag is about 30 to 60 μm .

Patentansprüche

1. Sicherungsetikett für die Warenüberwachung aufweisend ein dünnes, ebenes, elastisches Substrat (5), auf dessen beiden Seiten Komponenten aus einem flexiblen Material angeordnet sind, wobei die Komponenten derart zusammengefügt sind, daß sie zumindest einen Schwingkreis bilden, der aufweist:

einen ersten und einen zweiten Kondensator (C2, C3), deren Elektroden von leitenden Bereichen auf gegenüberliegenden Seiten des Substrates gebildet werden, so daß die Elektroden auf den gegenüberliegenden Seiten des Substrates im wesentlichen zueinander ausgerichtet und von derselben Größe sind;

ein erstes Paar von Leitungszweigen (1,2;10,11), wobei die Zweige auf gegenüberliegenden Seiten des Substrates (5) angeordnet und deren erste Enden mit den Elektroden des ersten Kondensators (C2) verbunden sind, und zumindest einer der Leitungszweige (1;10,11) als Spule ausgebildet ist und

ein zweites Paar von Leitungszweigen (3,4;12,13), wobei die Zweige auf gegenüberliegenden Seiten des Substrates (5) angeordnet und deren erste Enden mit den Elektroden des zweiten Kondensators (C3) verbunden sind, und zumindest einer der Leitungszweige (3;12,13) als Spule ausgebildet ist; wobei die zweiten Enden der Leitungszweige (1,3;10,12,14), die auf einer ersten Seite des Substrates angeordnet sind, mit einem Durchleitungsteil (18) oder einer ersten Elektrode (17) eines dritten Kondensators (C1) mittels eines gemeinsamen Leitungszweigabschnittes (X) verbunden sind, dadurch gekennzeichnet,

daß die zweiten Enden der Leitungszweige (2,4;11,13,15), die auf einer zweiten Seite des Substrates angeordnet sind, einzeln mit dem Durchleitungsteil (18) oder einer zweiten Elektrode (16) des dritten Kondensators (C1) verbunden sind, um einen Schwingkreis zu

schaffen.

2. Sicherungsetikett für die Warenüberwachung nach Anspruch 1, dadurch gekennzeichnet, daß beide Zweige (10,11;12,13;14,15) des ersten und/oder zweiten Paares von Leitungszweigen als Spule ausgebildet sind.
3. Sicherungsetikett für die Warenüberwachung nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, daß beide Zweige des ersten und zweiten Paares von Leitungszweigen (10,11;12,13) als Spule ausgebildet sind, wobei die Zweige (10,12) des ersten und zweiten Paares von Leitungszweigen, die auf derselben Seite des Substrates (5) angeordnet sind, parallel angeordnet sind, so daß, wenn der Zweig 10 des ersten Paares von Leitungszweigen, der oberhalb des Substrates (5) ist, der äußerste Zweig ist, der Zweig (11) des ersten Paares von Leitungszweigen, der unterhalb des Substrates (5) ist, der innerste Zweig ist.
4. Sicherungsetikett für die Warenüberwachung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Leitungszweige (1 bis 4; 10 bis 15) eine Breite von 100 bis 200 μm aufweisen.
5. Sicherungsetikett für die Warenüberwachung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß das Etikett einen Oberflächenbereich mit einer Größe von 5 bis 10 cm^2 aufweist und die Dicke des Etiketts 30 bis 60 μm beträgt.

Revendications

1. Etiquette de surveillance d'article comprenant un mince substrat plan et élastique (5) sur les deux faces duquel sont agencés des composants en matériau flexible, lesdits composants se rejoignant pour former au moins un circuit oscillant comportant

un premier et un second condensateurs (C2, C3) dont les électrodes sont formées par des régions conductrices agencées sur des faces opposées du substrat de telle sorte que lesdites électrodes sur les faces opposées du substrat soient sensiblement alignées et de mêmes dimensions ;

une première paire de branches de conducteur (1, 2 ; 10, 11), lesdites branches étant agencées sur les faces opposées du substrat (5), leurs premières extrémités étant raccordées aux électrodes du premier condensateur (C2), et au moins une des branches de conducteur (1 ; 10, 11) se présentant sous la forme d'un enroulement ;

une seconde paire de branches de conducteur

(3, 4 ; 12, 13), lesdites branches étant agencées sur les faces opposées du substrat (5), leurs premières extrémités étant raccordées aux électrodes du second condensateur (C3), et au moins une des branches de conducteur (3 ; 12, 13) se présentant sous la forme d'un enroulement ; et

les secondes extrémités des branches de conducteur (1, 3 ; 10, 12, 14) situées sur une première face du substrat sont reliées à un élément de traversée (18) ou à une première électrode (17) d'un troisième condensateur (C1) au moyen d'un élément de branche de conducteur (X) commun,

caractérisée en ce que les secondes extrémités des branches de conducteur (2, 4 ; 11, 13, 15) situées sur une seconde face du substrat sont raccordées, indépendamment les unes des autres, audit élément de traversée (18) ou à la seconde électrode (16) dudit troisième condensateur (C1) pour fournir un circuit oscillant.

2. Etiquette de surveillance d'article selon la revendication 1, caractérisée en ce que les deux branches (10, 11 ; 12, 13 ; 14, 15) des première et/ou seconde paires de branches de conducteur se présentent sous la forme d'enroulements.
3. Etiquette de surveillance d'article selon l'une quelconque des revendications 1 à 2, caractérisée en ce que les deux branches des première et seconde paires de branches de conducteur (10, 11 ; 12, 13) se présentent sous la forme d'enroulements, les branches (10, 12) des première et seconde paires de branches de conducteur situées sur la même face du substrat (5) étant agencées en parallèle de sorte que si la branche (10) de la première paire de branches de conducteur, qui est située au-dessus du substrat (5), se trouve le plus à l'extérieur, la branche (11) de la première paire de branches de conducteur, qui est située sous le substrat (5), se trouve le plus à l'intérieur.
4. Etiquette de surveillance d'article selon l'une quelconque des revendications 1 à 3, caractérisée en ce que les branches de conducteur (1 à 4 ; 10 à 15) ont une largeur de 100 à 200 μm .
5. Etiquette de surveillance d'article selon l'une quelconque des revendications 1 à 4, caractérisée en ce que l'étiquette a une surface d'environ 5 à 10 cm^2 et une épaisseur d'environ 30 à 60 μm .

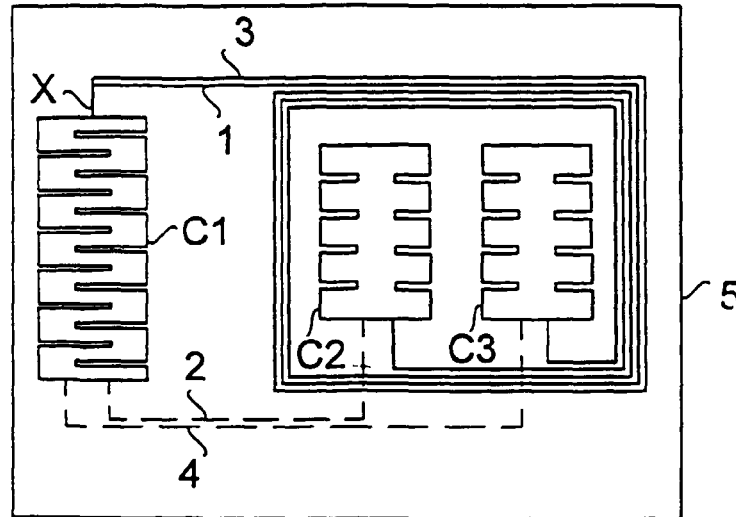


FIG. 1

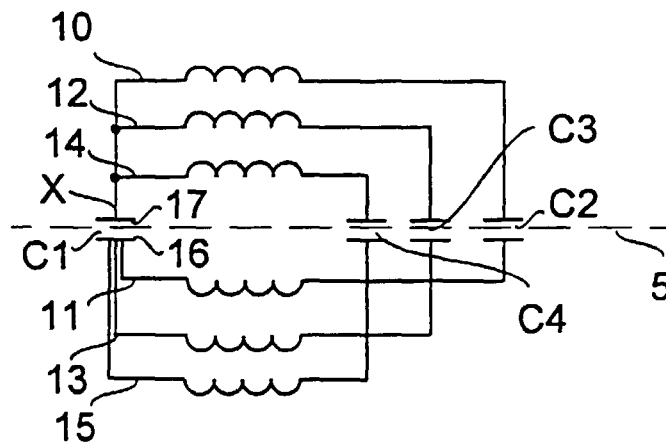


FIG. 2

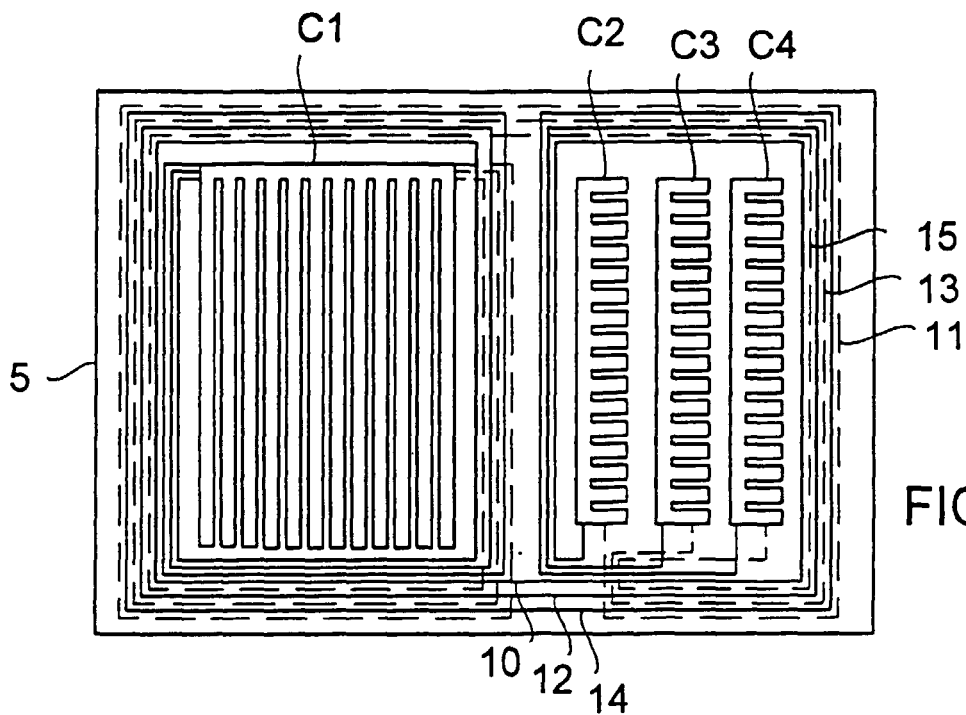


FIG. 4

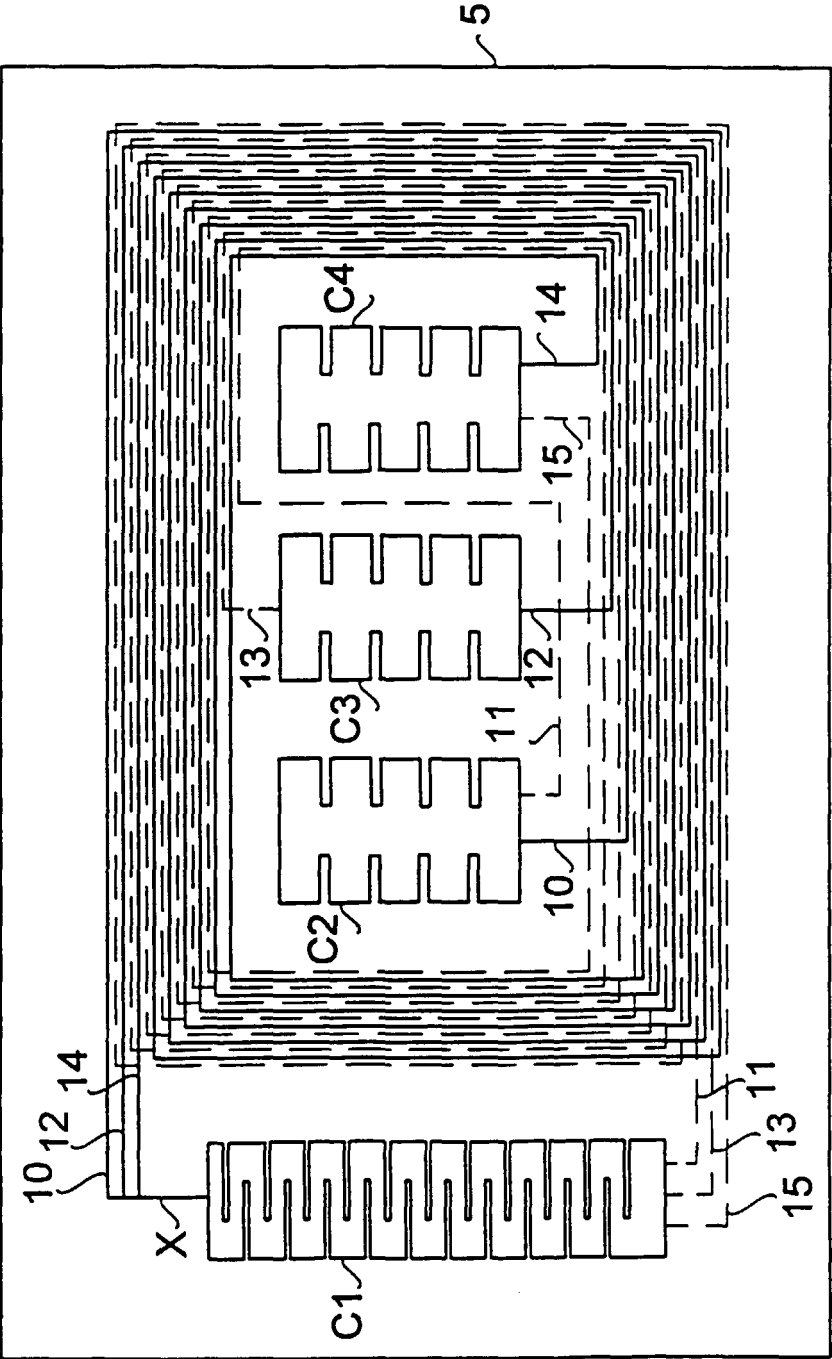


FIG. 3

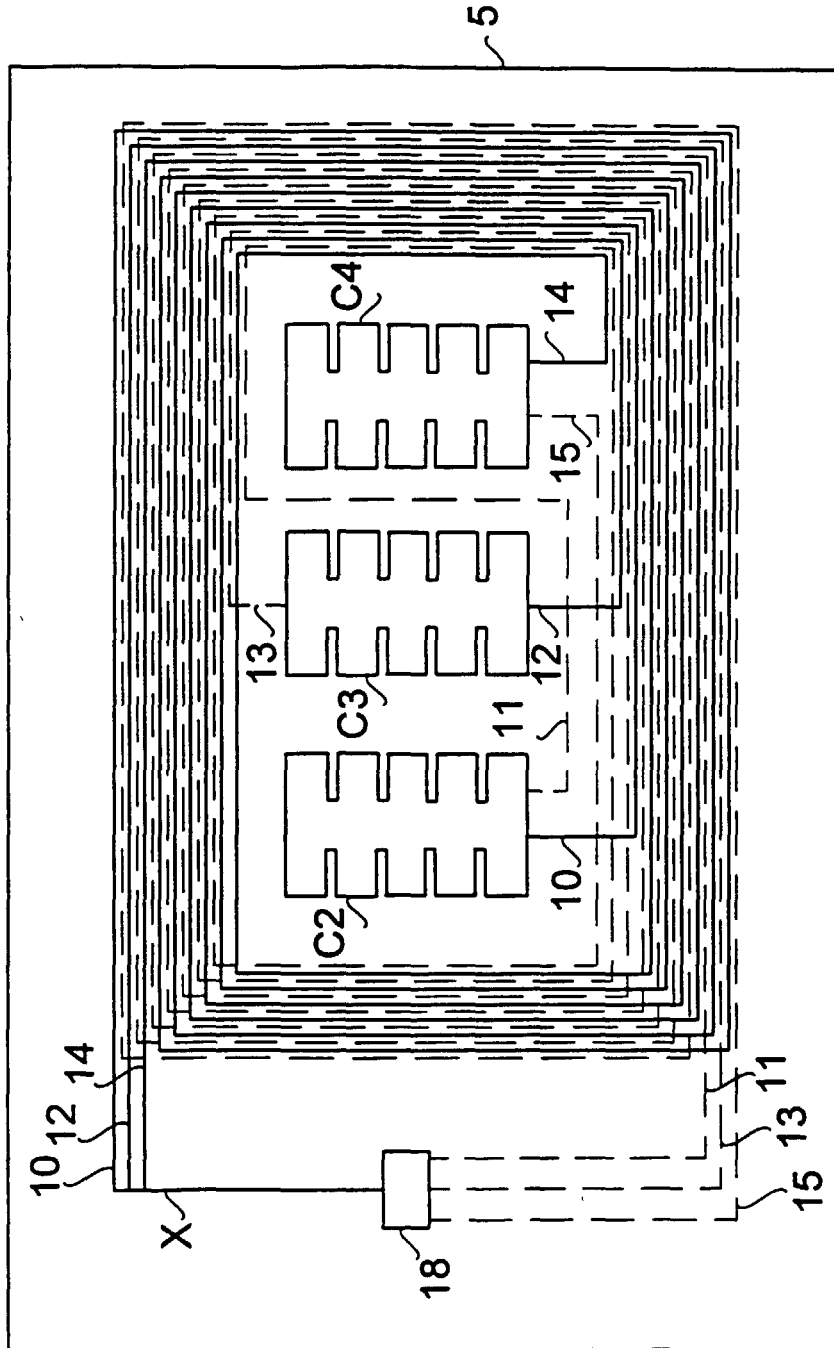


FIG. 5