

## SHIELDING DEVICE FOR A SWITCHING POWER SUPPLY TRANSFORMER

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### BACKGROUND OF THE INVENTION

This invention concerns an electromagnetic shielding device for a switching power supply transformer.

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### DESCRIPTION OF THE PRIOR ART

Switching power supplies are currently used on most television sets and computer monitors. Each of these power supplies is fitted with a transformer mounted on a chassis, which itself is placed beneath the cathode ray tube (CRT) of the television or monitor.

These power supplies operate by chopping or switching the current. This switching has the undesirable effect of inducing parasitic electromagnetic radiation at the transformer which affects electromagnetic receivers, in particular CRT deflecting coils. This creates varying degrees of image disturbance whose visibility depending on the switching frequency, the physical position of the transformer and the sensitivity of the deflecting coils.

In the case of a synchronized switching frequency of fixed value, these electromagnetic disturbances actually exist but fortunately they are not visible on the screen since they appear during the return phase of the scanning spot.

However, some switching power supplies operate at a frequency that varies significantly according to the electrical power demand by the television set or monitor, the power supply voltage and the demand on the transformer. This switching frequency then varies continuously, resulting in a beat phenomenon between this frequency and fixed scanning frequency of the spot on the television set or monitor. This frequency beating causes image pollution on the screen which appears visually as a horizontal "pattern" that may be more or less dark, in

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other words a grayish strip that scrolls on the CRT screen and which is obviously unacceptable in the vast majority of cases. Since it is usually impossible to physically move the switching transformer sufficiently far away (it would have to be completely removed from the chassis of the television or monitor), another solution must be found to avoid this image pollution phenomenon.

First, it would be possible to invert the parasitic electromagnetic field transmitted by the switching transformer by inverting its windings to shift this field. This solution is unfortunately insufficient to efficiently prevent the image pollution mentioned above, and therefore a shielding device has to be provided for this transformer.

One shielding device that is currently used on these transformers consists of a metal cover which completely encloses the transformer, which obviously gives an excellent result from the point of view of protection against the image pollution mentioned above. However, this cover is physically large and is expensive to manufacture (if only due to the price of the raw material). Furthermore, this completely enclosing cover reduces safety distances between the primary and secondary circuits of the transformer since it necessarily passes close to certain cable or wiring outlets; it is usually necessary to insulate the inside of this metal cover by depositing a coat of insulating material in order to respect compulsory galvanic insulation standards. It is also usually necessary to insulate the outer surface in the same way, since the distance between the cover and electronic components located on the television board is usually too short to respect safety standards. This increases the cost price of this shielding part, which is already high.

Another shielding solution is to provide a magnetic loop consisting of an annular copper strip which encloses the middle part of the transformer parallel to the plate on which its output pins are soldered.

In a transformer made in "layers", this shielding ring is installed directly by tight winding followed by soldering of this ring around the transformer's "belly" (the part containing its windings). This solution provides satisfactory electromagnetic protection, but not as good as the total shielding provided by the cover described

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above. Moreover, it is also expensive, since it is an add-on part that must be placed precisely around the transformer, enclosing it closely to prevent any risk of movement (this risk would be contrary to safety standards), and on which a soldering operation has to be carried out to guarantee that it is short circuited.

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Furthermore, these layered transformers are increasingly tending to be replaced by "flat coil" transformers for obvious reasons related to easier automation during manufacture. This type of transformer is shown in figure 1 under the general reference 1.

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In this figure, we see the transformer's ferrite core 2, the "flat coils" 3, the wires 4 that they guide and support, and the transformer's input/output pins 5.

For this type of transformer, it is obviously impossible to provide a short circuited metal strip enclosing the belly, since the flat coils 3 are fitted with projecting parts of complicated shape. The solution then adopted consists in providing a plastic cover 6 which completely encloses the transformer 1 as shown on the drawing, around which a metal shielding loop 7 is fitted of about the same height and thickness as those used on layer-type transformers. This part 6, 7 is click-fitted onto the transformer 1. This part, like the solutions mentioned previously, is expensive to manufacture and is difficult to mount automatically on a switching transformer assembly line. Furthermore, as in the case of the magnetic loop described above, the electromagnetic protection provided is not absolutely perfect.

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## SUMMARY OF THE INVENTION

The present invention is designed to overcome these disadvantages.

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It consists of an electromagnetic shielding device for a switching power supply transformer, composed of a single metal cap having a flat bottom and downward-facing edges that fits on top of said transformer and provides electromagnetic protection for this transformer.

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The width of the edges of said cap is small enough so that it does not affect the galvanic insulation provided by the transformer, but nevertheless wide enough to facilitate its placing (for example by a robot) on top of the transformer, and to provide the required electromagnetic protection.

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The cap is preferably made by stamping. Its design enables it to be easily placed and fixed, for example by gluing, on the ferrite core of said transformer. It is placed on the ferrite core after applying glue to this core (drops of glue at one or two points, for example), this glue preferably being the same as that used to assemble the parts of the ferrite core. These gluing and fitting operations are easily performed using an automated assembly system.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and other advantages will become clear on reading the following description of an embodiment, taken as a non-limitative example, making reference to the appended figures, of which:

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- Figure 1, already described, is a front view of a system of shielding of a power supply transformer, according to the prior art;

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- Figure 2 is a full-scale perspective view of a shielding device for a switching power supply transformer, according to the invention, showing its method of fitting on the transformer.

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Referring to figure 2, the switching power supply transformer 1 in figure 1 is shown in perspective, with its ferrite core 2, its flat coils 3, its connection wires 4, and its input/output pins 5.

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The electromagnetic shielding device consists of a cap 7 in the form of a dish or tray that is made by stamping. The flat bottom 8 of this cap is rectangular and has the same outside dimensions as the upper rectangular face 9 of the ferrite core 2. The cap 7 may be made of copper, aluminum or brass, for example.

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The edges 10 of the cap 7 are inclined at an angle  $\alpha$  with respect to the line perpendicular to the bottom plane 8. This angle, which may be of the order of 15° to 20°, for example, is optimized to facilitate automatic placement of the cap 7 on the top of transformer 1 (as shown by the dashed line on the drawing) with edges 10 facing downwards, and to provide the required electromagnetic protection.

The width L of these edges 10 is chosen to be small (for example of the order of a few millimeters); it must be wide enough so that placement of cap 7 on the top face 9 of core 2 is as easy as possible, but not too wide. In this way the galvanic protection standards for the transformer can be respected, while providing the required electromagnetic isolation.

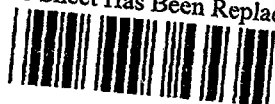
The simple shape of the shielding cap 7, with no cutouts or sharp points that could catch on other parts, and its compact size facilitate its manipulation on an automated assembly line with a vibrating hopper feeder. No costly change of the production line should be necessary.

Two droplets of glue 11, 12 are placed on the top face 9 of the ferrite core 2 before a robot places the cap 7 (in the direction of arrow F and with edges 10 facing downwards) on the top 9 of transformer 1, this glue preferably being the same as is used to assemble the two halves of the ferrite core 2 at 13 (which provides a cost advantage from the point of view of glue provisioning).

With this shielding device, electromagnetic protection performances of television set and monitor deflecting coils are almost perfect.

Obviously, the invention is not limited to the embodiment described above, and can be made in other equivalent forms.

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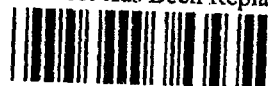
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# WHAT IS CLAIMED IS

- 5 1. Electromagnetic shielding device for a switching power supply transformer, composed of a single metal cap having a flat bottom and downward-facing edges that fits on top of said transformer and provides electromagnetic protection for this transformer.
- 10 2. Electromagnetic shielding device according to claim 1, wherein said metal cap is made by stamping.
3. Electromagnetic shielding for a switching power supply transformer according to claim 1, that can be fixed by gluing to the top surface of the  
15 ferrite core of said transformer, using the same glue as that used to assemble the components of this ferrite core.
4. Television power supply transformer that includes an electromagnetic shielding device according to claim 1.
- 20 5. Transformer according to claim 4, composed of a ferrite core and flat coils that guide wires connected to the connection pins.
- 25 6. Television fitted with a switching power supply transformer, wherein this transformer includes an electromagnetic shielding device according to claim 1.



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SCREENING DEVICE FOR SWITCHED-MODE POWER  
SUPPLY TRANSFORMER

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The present invention relates to an electromagnetic screening device for a switched-mode power supply transformer.

Switched-mode power supplies currently equip the large majority of television sets and of monitors for computer installations. Each of these power supplies is provided with a transformer placed on a chassis, which is itself positioned below the cathode-ray tube of the television set or of the monitor.

These power supplies operate by chopping the current, or switching it on and off, and this switching has the undesirable effect, within the transformer, of inducing stray electromagnetic radiation which acts on the electromagnetic receivers which particularly the deflection coils of the cathode-ray tube constitute. This results in image disturbances, which are more or less significant, that is to say more or less visible, according to the value of the switching frequency, the physical position of the transformer and the sensitivity of the deflection coils.

In the case where a synchronized and fixed-value switching frequency is involved, these electromagnetic disturbances certainly exist, but they are very fortunately not represented on the screen as they appear during a period of time when the scanning spot is in its flyback phase.

On the other hand, some switched-mode power supplies operate at a frequency which varies significantly as a function of the electrical power demanded by the television set or the monitor, as a function of its power supply voltage, and as a function of what is demanded of the transformer. This switching frequency is then constantly varying, and this results in a phenomenon of beating between the latter and the fixed scanning frequency of the spot of the television set or of the monitor. This frequency beating produces an image

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interference phenomenon on the screen, which is expressed visually by a more or less dark horizontal "moiré pattern", that is to say by a greyish band which scrolls on the screen of the cathode-ray tube, which clearly cannot be allowed in the large majority of cases. As it is not generally possible to shift the switched-mode transformer physically by a sufficient distance (it would then be necessary to take it completely out of the chassis of the television set or of the monitor), another solution has to be found to remedy this image interference phenomenon.

It might be thought, in the first place, to reverse the stray electromagnetic field emitted by the switched-mode transformer, by reversing its windings in order to shift this field. Such a palliative unfortunately turns out to be insufficient for completely avoiding the abovementioned image interference, and finally a device for screening this transformer has to be provided.

A first screening device, currently existing on these transformers, consists of a metal cap which completely envelopes the transformer, which, obviously, gives an excellent result from the point of view of protection against the abovementioned image interference. However, this takes the form of a component of large size, which is expensive in terms of fabrication cost (if only due to the cost of the raw material). Moreover, this largely enveloping cap tends to reduce the safety distances between the two primary and secondary circuits of the transformer, since it passes close to some of the cable or wire outlets: in order to comply with the obligatory standards for electrical insulation, it is then most often necessary to insulate the interior of this metal cap by depositing a layer of insulating material. It is moreover generally necessary to insulate its outer part in the same way, as this cap often comes to a distance from the electronic components, situated on the circuit board of the television set, which is too small to comply with the safety standards. This results

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in an increase in the already high cost price of this screening component.

Another screening solution consists in providing a magnetic loop, consisting of an annular strip of copper which encloses the mid-part of the transformer parallel to the circuit board onto which its output pins are soldered.

With this being a transformer in "layered" mode, the fitting of this screening ring takes place directly by tightly winding and soldering this ring round the "belly" of the transformer (that is to say around the part which includes its winding). This solution gives results which are satisfactory from the point of view of electromagnetic protection, but however not as good as that obtained by the abovementioned total screening. It nevertheless remains quite expensive, since it involves a fitted component which has to be placed precisely around the transformer, clamping it tightly in order to avoid any risk of movement (such a risk would be contrary to the safety standards), and on which a soldering operation has to be carried out in order to guarantee that it is short-circuited.

Moreover, these transformers in layered mode tend more and more to be replaced by transformers in "pancake" mode, for obvious reasons of ease of automation of their method of fabrication. A transformer of this type is represented, under the general reference 1, on the attached Figure 1.

In this figure, the ferrite core of the transformer is designated by the reference 2, the "pancakes" by 3, the wires which they guide and support by 4, and the input/output pins of the transformer by 5.

For such a transformer, it is obviously not possible to provide a short-circuited metal ribbon clamping it round the belly, since the pancakes 3 are provided with jagged parts projecting. The solution which is then adopted consists in providing a plastic cap 6, which completely envelopes the transformer 1 as represented in the drawing, and around which a metal screening

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loop 7 has previously been fixed, similar in height and thickness to those provided for transformers of the layered type. This component 6, 7 is fixed by clipping sweat [sic] the transformer 1. Here again, this is a component which, like the preceding one, is expensive in terms of fabrication cost, and which lends itself badly to automatic fitting on a production line for these switched-mode transformers. Moreover, as in the preceding case, the electromagnetic protection performance obtained is not absolutely perfect.

The invention aims to remedy these drawbacks. To this end it relates to an electromagnetic screening device for a switched-mode power supply transformer, intended in particular to equip a television set or a monitor, this device consisting of a single metal component in the shape of a trough or tray with a flat bottom and with turned down edges, which fits on top of the transformer in order to provide the electromagnetic protection of this transformer in such a way that this metal component can easily be placed, and fixed for example by bonding, on to the ferrite core. These edges are chosen to be of sufficiently narrow width as not to affect the electrical insulation conferred by the transformer, but are, however, large enough to, on the one hand, allow this tray to be fitted easily (for example by robot) on to the top of the transformer and to, on the other hand, provide the desired electromagnetic protection. This component is preferably produced by stamping. It is placed on the ferrite core after prior deposition of adhesive on the latter, (one or two spots of adhesive for example), this adhesive advantageously being the same as that used to bond the elements of this ferrite core together. These operations of bonding and of fitting are easily carried out by an automatic robot line.

In any event, the invention will be well understood, and its advantages and other characteristics will emerge, during the following description of a non-limiting embodiment example, by reference to the attached Figure 2, which represents this screening device, in

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perspective and to scale 1, and the method of putting it in place on a switched-mode power supply transformer.

Referring to this Figure 2, the switched-mode power supply transformer 1 of Figure 1 is represented here in perspective, with its ferrite core 2, its pancakes 3, its connecting wires 4, and its input/output pins 5.

The electromagnetic screening device consists of a copper trough, or tray 7, produced by stamping. The flat bottom 8 of this tray is rectangular and is of the same external dimensions as those of the upper rectangular face 9 of the ferrite core 2. The tray 7 may be made of Al, brass, etc.

The edges 10 of the tray 7 are flared, with an angular slope  $\alpha$  with respect to the axis perpendicular to the plane of the bottom 8 which, being of the order of 15 to 20 degrees for example, is optimized both to allow easy automatic placing of the cap 7 on to the top of the transformer 1 (as indicated in dots and dashes in the drawing) with the edges 10 turned downwards, and to provide the desired electromagnetic protection.

The width L of these edges 10 is chosen to be narrow (of the order of a few millimetres for example): it must be sufficient to make it as easy as possible to place the tray 7 on the upper face 9 of the core 2, but not too large, while providing the desired electromagnetic protection, to comply with the standards for electrical protection of the transformer.

The simple shape, without cutouts or sharp edges running the risk of causing components to catch on to one another, of the screening tray 7, and its small size allow it to be fed easily in a robotized automatic line, with a vibratory feeder hopper, without substantial modification to the production lines.

Prior to the tray 7 being placed by robot - along the arrow F and with the edges 10 turned downwards - on to the top 9 of the transformer 1, two spots of adhesive 11, 12 are deposited on this upper face 9 of the ferrite core 2, this adhesive advantageously being the same as

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that used to assemble, at 13, the two halves of the ferrite core 2 (which is very advantageous from the point of view of the provisioning of adhesive, for which no additional cost is thereby entailed in practice).

The electromagnetic protection performance of the deflection coils of television sets and monitors is practically perfect, with this screening device.

Needless to say, the invention is not limited to the embodiment just described but may, quite to the contrary, be provided in other equivalent forms.

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## CLAIMS

1. Electromagnetic screening device for a switched-mode power supply transformer, characterized in that it consists of a single metal component (7) with a flat bottom (8) and turned down edges which fits on top (9) of the transformer (1) in order to provide the electromagnetic protection of this transformer (1).
2. Electromagnetic screening device according to Claim 1, characterized in that this metal component (1 [sic]) is produced by stamping.
3. Electromagnetic screening for switched-mode power supply transformer according to either of Claims 1 and 2, characterized in that it can be fixed by bonding (11, 12) onto the upper face (9) of the ferrite core (2) of the transformer (1), using the same adhesive as is used to join (13) the constituent elements of this ferrite core (2) together.
4. Power supply transformer for television set, characterized in that it includes an electromagnetic screening device according to any one of the preceding claims.
5. Transformer according to Claim 4, characterized in that it consists of a ferrite core (2) and of pancakes (3) guiding wires (4) connected to the connection pins 5.
6. Television set including a switched-mode power supply transformer, characterized in that this transformer includes an electromagnetic screening device according to any one of Claims 1 to 3.

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# ABSTRACT

Electromagnetic screening for a switched-mode power supply transformer, in particular for a television set or for a monitor.

It consists of a cap made in the shape of a trough (7) with a flat bottom (8) and with flared ( $\alpha$ ) edges (10) and relatively narrow width (L). It is placed automatically onto the upper face (9) of the ferrite core (2), the shape of which it matches, with prior deposition of two spots (11, 12) of adhesive. This adhesive is the same one as is used to join (13) the ferrite core (2) together.

Figure 2.

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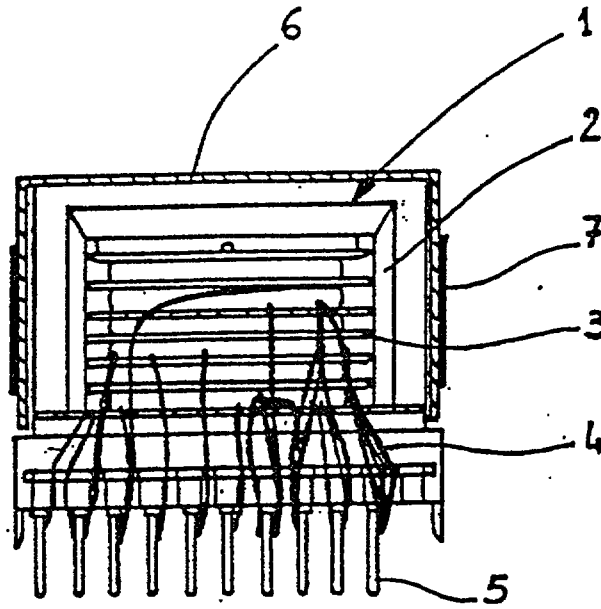


Fig.1

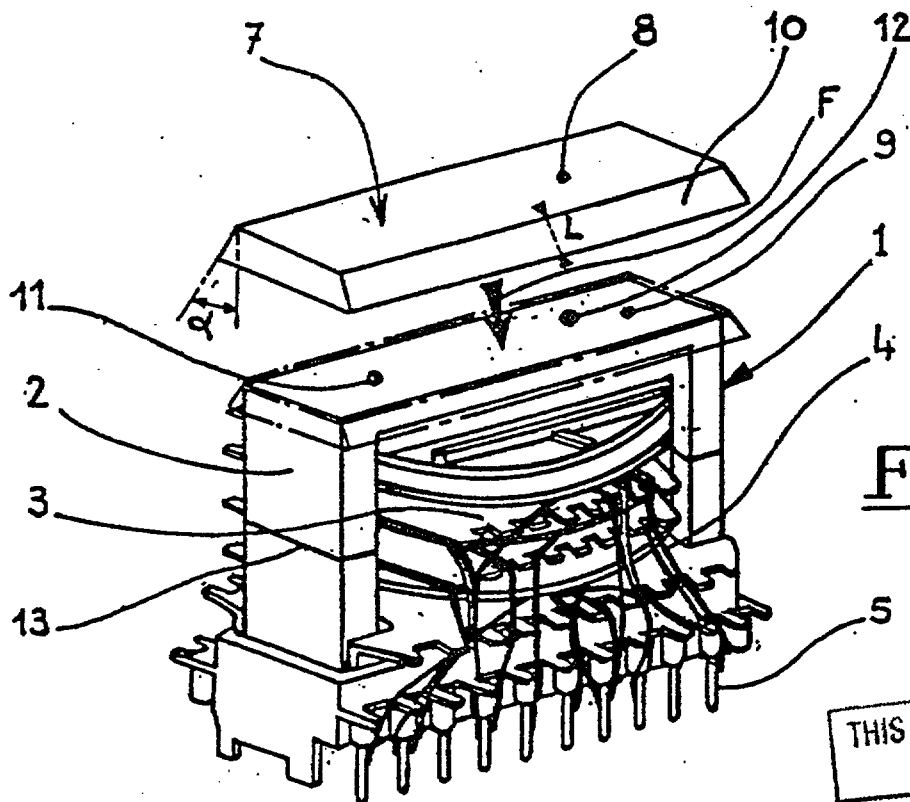


Fig.2

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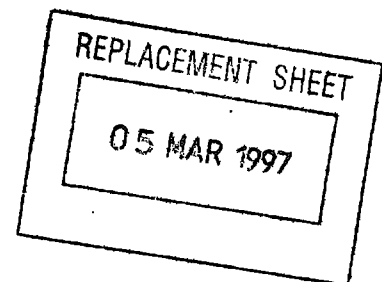
## ABSTRACT -

## SCREENING DEVICE FOR SWITCHED-MODE POWER SUPPLY TRANSFORMER

Electromagnetic screening for a switched-mode power supply transformer, in particular for a television set or for a monitor.

It consists of a cap made in the shape of a trough (7) with a flat bottom (8) and with flared ( $\alpha$ ) edges (10) and relatively narrow width (L). It is placed automatically onto the upper face (9) of the ferrite core (2), the shape of which it matches, with prior deposition of two spots (11, 12) of adhesive. This adhesive is the same one as is used to join (13) the ferrite core (2) together.

Figure 2.



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SHIELDING DEVICE FOR A SWITCHING POWER SUPPLY TRANSFORMER

The present invention relates to a switched-mode power supply transformer equipped with electromagnetic screening means.

Switched-mode power supplies currently equip the large majority of television sets and of monitors for computer installations. Each of these power supplies is provided with a transformer placed on a chassis, which is itself positioned below the cathode-ray tube of the television set or of the monitor.

These power supplies operate by chopping the current, or switching it on and off, and this switching has the undesirable effect, within the transformer, of inducing stray electromagnetic radiation which acts on the electromagnetic receivers which particularly the deflection coils of the cathode-ray tube constitute. This results in image disturbances, which are more or less significant, that is to say more or less visible, according to the value of the switching frequency, the physical position of the transformer and the sensitivity of the deflection coils.

In the case where a synchronized and fixed-value switching frequency is involved, these electromagnetic disturbances certainly exist, but they are very fortunately not represented on the screen as they appear during a period of time when the scanning spot is in its flyback phase.

On the other hand, some switched-mode power supplies operate at a frequency which varies significantly as a function of the electrical power demanded by the television set or the monitor, as a function of its power supply voltage, and as a function of what is demanded of the transformer. This switching frequency is then constantly varying, and this results in a phenomenon of beating between the latter and the fixed scanning frequency of the spot of the television set or of the monitor. This frequency beating produces an image interference phenomenon on the screen, which is expressed visually by a more or less dark horizontal "moiré pattern", that is to say by a greyish band which scrolls on

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the screen of the cathode-ray tube, which clearly cannot be allowed in the large majority of cases. As it is not generally possible to shift the switched-mode transformer physically by a sufficient distance (it would then be necessary to take it completely out of the chassis of the television set or of the monitor), another solution has to be found to remedy this image interference phenomenon.

It might be thought, in the first place, to reverse the stray electromagnetic field emitted by the switched-mode transformer, by reversing its windings in order to shift this field. Such a palliative unfortunately turns out to be insufficient for completely avoiding the abovementioned image interference, and finally a device for screening this transformer has to be provided.

A first screening device, currently existing on these transformers, consists of a metal cap which completely envelopes the transformer, which, obviously, gives an excellent result from the point of view of protection against the abovementioned image interference. However, this takes the form of a component of large size, which is expensive in terms of fabrication cost (if only due to the cost of the raw material). Moreover, this largely enveloping cap tends to reduce the safety distances between the two primary and secondary circuits of the transformer, since it passes close to some of the cable or wire outlets: in order to comply with the obligatory standards for electrical insulation, it is then most often necessary to insulate the interior of this metal cap by depositing a layer of insulating material. It is moreover generally necessary to insulate its outer part in the same way, as this cap often comes to a distance from the electronic components, situated on the circuit board of the television set, which is too small to comply with the safety standards. This results in an increase in the already high cost price of this screening component. Patent Application DE 1069711 from Siemens proposes a shuttering formed by two metal shutters the edges of which are face-to-face but which do not

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join. There is thus a saving in material, but the problem of size remains undiminished.

Another screening solution consists in providing a magnetic loop, consisting of an annular strip of copper which encloses the mid-part of the transformer parallel to the circuit board onto which its output pins are soldered.

With this being a transformer in "layered" mode, the fitting of this screening ring takes place directly by tightly winding and soldering this ring round the "belly" of the transformer (that is to say around the part which includes its winding). This solution gives results which are satisfactory from the point of view of electromagnetic protection, but however less good than that obtained by the abovementioned total screening. It nevertheless remains quite expensive, since it involves a fitted component which has to be placed precisely around the transformer, clamping it tightly in order to avoid any risk of movement (such a risk would be contrary to the safety standards), and on which a soldering operation has to be carried out in order to guarantee that it is short-circuited.

The Patent EP 0131700 describes a solution avoiding the necessity for soldering. The transformer is assembled by means of a clip-on metal cage made as a single piece, which includes the screening ring.

Moreover, these transformers in "layered" mode tend more and more to be replaced by transformers in "pancake" mode, for obvious reasons of ease of automation of their method of fabrication. A transformer of this type is represented, under the general reference 1, on the attached Figure 1.

In this figure, the ferrite core of the transformer is designated by the reference 2, the "pancakes" by 3, the wires which they guide and support by 4, and the input/output pins of the transformer by 5.

For such a transformer, it is obviously not possible to provide a short-circuited metal ribbon clamping it round the belly, since the "pancakes" 3 are

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provided with parts projecting jaggedly. The solution which is then adopted consists in providing a plastic cap 6, which completely envelopes the transformer 1 as represented in the drawing, and around which a metal screening loop 7 has previously been fixed, similar in height and thickness to those provided for transformers of the "layered" type. This component 6, 7 is fixed by clipping on to the transformer 1. Here again, this is a component which, like the preceding one, is expensive in terms of fabrication cost, and which lends itself badly to automatic fitting on a production line for these switched-mode transformers. Moreover, as in the preceding case, the electromagnetic protection performance obtained is not absolutely perfect.

The invention aims to remedy these drawbacks. To this end it relates to a switched-mode power supply transformer, intended in particular to equip a television set or a monitor, the transformer being equipped with connections, with a ferrite core having a flat face situated at the opposite end to the connections, and with electromagnetic screening means. The screening means consist of a single tray in the shape of a trough having a flat bottom designed to match the shape of the flat face of the ferrite core opposite the connections, and of the edges turned towards the core. This metal tray can easily be placed, and fixed for example by bonding, on to this ferrite core. These edges are chosen to be of sufficiently narrow width as not to affect the electrical insulation conferred by the transformer, but are, however, large enough to, on the one hand, allow this tray to be fitted easily (for example by robot) on to the top of the transformer and to, on the other hand, provide the desired electromagnetic protection. This component is preferably produced by stamping. It is placed on the ferrite core after prior deposition of adhesive on the latter, (one or two spots of adhesive for example), this adhesive advantageously being the same as that used to bond the elements of this ferrite core together. These operations of bonding and of fitting are easily carried

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out by an automatic robot line.

In any event, the invention will be well understood, and its advantages and other characteristics will emerge, during the following description of a non-limiting embodiment example, by reference to the attached Figure 2, which represents this screening device, in perspective and to scale 1, and the method of putting it in place on a switched-mode power supply transformer.

Referring to this Figure 2, the switched-mode power supply transformer 1 of Figure 1 is represented here in perspective, with its ferrite core 2, its pancakes 3, its connecting wires 4, and its input/output pins 5.

The electromagnetic screening device consists of a copper trough, or tray 7, produced by stamping. The flat bottom 8 of this tray is rectangular and is of the same external dimensions as those of the upper rectangular face 9 of the ferrite core 2. The tray 7 may be made of Al, brass, etc.

The edges 10 of the tray 7 are flared, with an angular slope  $\alpha$  with respect to the axis perpendicular to the plane of the bottom 8 which, being of the order of 15 to 20° for example, is optimized both to allow easy automatic placing of the cap 7 on to the top of the transformer 1 (as indicated in dots and dashes in the drawing) with the edges 10 turned downwards, and to provide the desired electromagnetic protection.

The width L of these edges 10 is chosen to be narrow (of the order of a few millimetres for example): it must be sufficient to make it as easy as possible to place the tray 7 on the upper face 9 of the core 2, but not too large, while providing the desired electromagnetic protection, to comply with the standards for electrical protection of the transformer.

The simple shape, without cutouts or sharp edges running the risk of causing components to catch on to one another, of the screening tray 7, and its small size allow it to be fed easily in a robotized automatic line, with a vibratory feeder hopper, without substantial

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modification to the production lines.

Prior to the tray 7 being placed by robot - along the arrow F and with the edges 10 turned downwards - on to the top 9 of the transformer 1, two spots of adhesive 11, 12 are deposited on this upper face 9 of the ferrite core 2, this adhesive advantageously being the same as that used to assemble, at 13, the two halves of the ferrite core 2 (which is very advantageous from the point of view of the provisioning of adhesive, for which no additional cost is thereby entailed in practice).

The electromagnetic protection performance of the deflection coils of television sets and monitors is practically perfect, with this screening device.

As is evident, the invention is not limited to the embodiment example that has just been described but is, on the contrary, capable of being carried out in other equivalent forms.



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## CLAIMS

1. Switched-mode power supply transformer (1), intended in particular to equip a television set or a monitor, the transformer being equipped with connections (5), with a ferrite core (2) having a flat face (9) situated at the opposite end to the connections (5), and with electromagnetic screening means, characterized in that the screening means consist of a single tray (7) in the shape of a trough having a flat bottom (8) designed to match the shape of the flat face (9) of the ferrite core (2) opposite the connections (5), and of the edges (10) turned towards the core (2).
2. Transformer (1) according to Claim 1, characterized in that the tray (7) is fixed to the ferrite core (2) by bonding by means of an adhesive which is the same as that used to assemble the constituent elements of the core of the transformer.
3. Television set or monitor equipped with a transformer (1) according to one of Claims 1 or 2.

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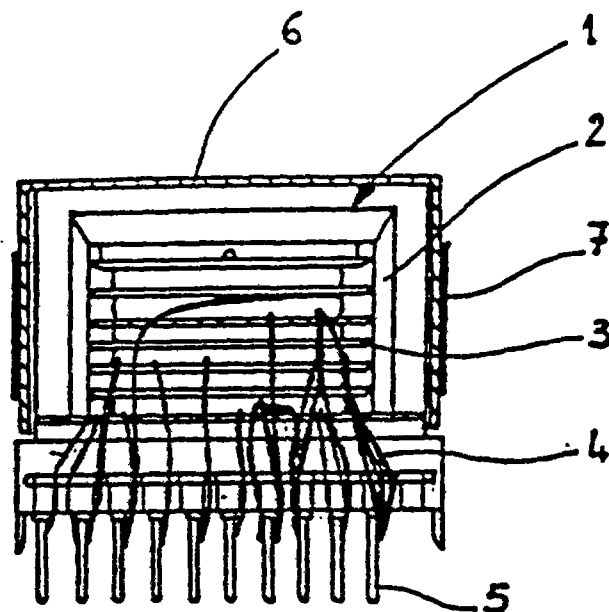


FIG. 1

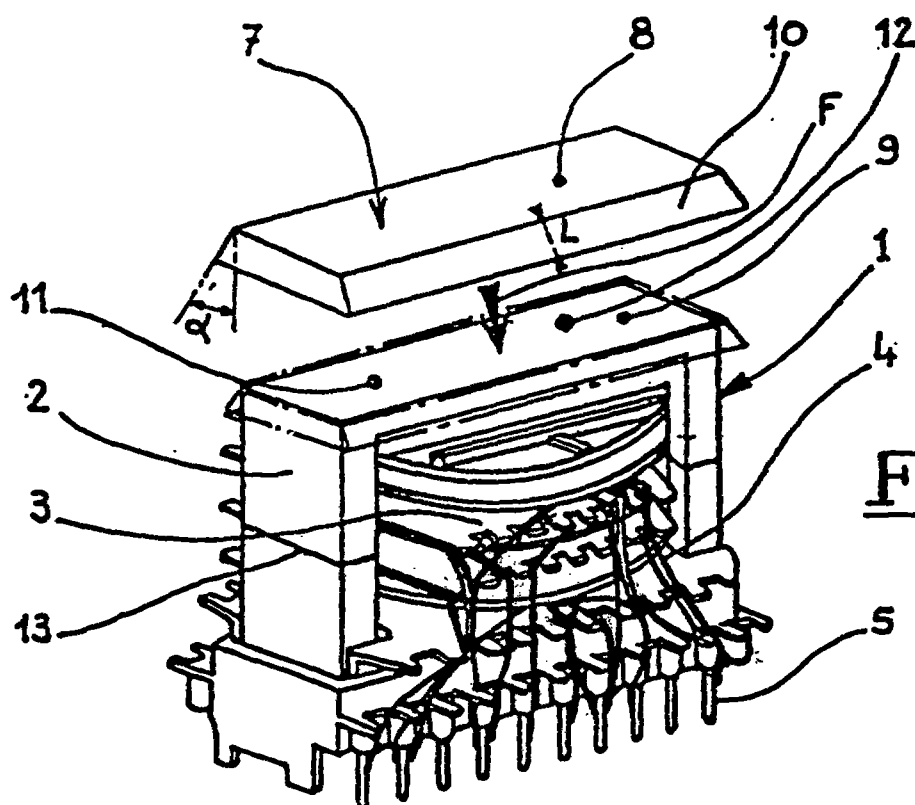


FIG. 2

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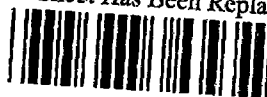
## ABSTRACT

SHIELDING DEVICE FOR A SWITCHING  
POWER SUPPLY TRANSFORMER

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10 The invention relates to an electromagnetic shielding for a switching power supply transformer, notably that of a television set or monitor, consisting of a cap in the form of a flat-bottomed tray with flared and relatively narrow edges. It can be automatically placed on the top of the ferrite core and matches its shape, after depositing drops of glue on this core. This glue is the same as that used for assembling the parts of the ferrite core.

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