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(54) Title: DEVICE FOR SYNCHRONIZING THE INTERMITTENT EMISSION OF ELECTRIC AND MAGNETIC ENERGY AND NON-IONIZING ELECTROMAGNETIC RADIATIONS WITH THE HEARTBEAT

(57) Abstract: The present invention relates to devices used in medical and veterinary therapies, and in aesthetic treatment, which avail of the use of electric and magnetic energy and non-ionizing electromagnetic radiations, capable of synchronizing the emission of energy with the heartbeat.

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**DEVICE FOR SYNCHRONIZING THE INTERMITTENT EMISSION OF ELECTRIC AND MAGNETIC ENERGY AND NON-IONIZING ELECTROMAGNETIC RADIATIONS WITH THE HEARTBEAT**

The present invention relates to a device for therapeutic and aesthetic treatment administered  
5 to human beings and animals, effected by the emission of electric and magnetic energy and non-ionizing electromagnetic radiations, characterized by the presence of an electric circuit which makes said emission intermittent and synchronized with the heartbeat frequency of the persons or animals subjected to said treatment.

It is known that in the treatment normally adopted in health centres which avail of the above  
10 forms of energy, for example electro-stimulation, magneto-therapy, Marconi-therapy, radar therapy, laser therapy and the like, the energy is applied with continuous or pulsating emission in a random and/or arbitrary way without any effective connection with the person subjected to treatment; this creates great limits in terms of results; furthermore, in the case of continuous emission, an undesired accumulation of heat can be observed, whereas in the case  
15 of arbitrary pulsating emission, even though the results are better than those of continuous emission, they are still limited and cannot be reproduced.

These drawbacks have been overcome in the particular case of European Patent no. 819017, which relates to a device for the synchronized emission of infrared radiation emitted from incandescent lamps and also to the use of said device for human therapies.

20 The Applicant, already inventor of the invention described in the above European patent, has now found, and this forms the object of the present invention, a device for the therapeutic and aesthetic treatment of human beings and animals, effected by the emission of electric, magnetic energy and non-ionizing electromagnetic radiations, characterized by the presence of an electric circuit which makes said emission intermittent and synchronized with the heartbeat  
25 frequency of the persons or animals subjected to treatment, which does not have the above disadvantages currently existing and which greatly amplifies the field of application of the device claimed in European Patent No. 819017.

The functioning principle of the device according to the present invention is illustrated by the scheme of figure 1, provided for purely illustrative purposes without limiting the scope of the

invention itself, wherein A represents the person (or animal) subjected to treatment, B the device containing the heartbeat detector, C is the source of energy, which may or may not be in contact with the body: the connecting lines of the three sections, with the directional arrows indicated, demonstrate how it is the heart of the person or animal subjected to treatment which establishes, by means of the heartbeat detector, when the energy source is to be activated. The device of the present invention therefore ensures that the energy emitted acts in phase concordance with the biorhythm of the person (or animal) subjected to treatment. The device according to the present invention is characterized by an electric circuit which controls the periodic activation or deactivation of the energy source, said activation-deactivation period being synchronized with the heartbeat. Furthermore, said device can also comprise a timer for determining the duration of the treatment.

The device according to the present invention can be applied in all forms of treatment based on the emission of electric, magnetic energy and non-ionizing radiation: in particular, electro-stimulation, tens, magneto-therapy, Marconi-therapy, radar therapy, laser therapy for anthalgic use, ultraviolet therapies, infrared therapies for animals.

The device can be used, with reference to electric and magnetic energy or non-ionizing radiations, adopting energy or radiations having any intensity, frequency and wave form, as well as any energy or radiation source, for example, any kind of generator in the case of electric or magnetic energy; in the case of radiation, apparatuses of the facing plate type for Marconi-therapy (radio frequencies, for example for the frequency of 27.12 MHz), with aerials for radar therapy (microwaves, for example, for the frequency of 2450 MHz), infrared diodes, and various types of laser (for example infrared), ultraviolet radiation generators, for example with wave lengths ranging from 180 nm to 400 nm.

The device of the invention can be used in effecting medical and aesthetic treatment for human beings, and also therapeutic treatment on animals, in particular mammals such as horses, dogs and cats.

A better understanding of the present invention can be obtained from the following examples, which are provided for purely illustrative purposes and should in no way be considered as limiting the scope of the invention itself.

## EXAMPLES

The following medical therapies were effected using the device according to the present invention:

**Electro-stimulation**

## 5 Example 1

Sex: male;

Age: 65 years old

Pathology: muscular contracture of the upper right limb

10 Symptoms: algia with partial articular blockage of the homo lateral elbow and  
nightly paresthesia of the hand;

Therapy: ten twenty minute applications in diastole synchronization three times a  
week;

Results: after the third session a 40-50% improvement in the clinical picture,  
until complete disappearance of the symptoms after the eighth session:

## 15 Example 2

Sex: female

Age: 30 years old

Pathology: edematous panniculitis with muscular yielding of the gluteus;

20 Symptoms: heaviness and swelling of the lower limbs with pain upon pressure, ve-  
nous stasis;

Therapy: fifteen 30 minute sessions, twice a week, alternating systole/diastole  
automatically varying every minute;

Results: after the fourth session improvement in the swelling and heaviness of  
the lower limbs to an extent of 70%, until the complete disappearance  
25 of the pain and examination. After the fifth session, an improvement is  
observed in the subgluteic folds.

## Magneto-therapy

## Example 3

Sex: male;

Age: 35 years old

Pathology: bursitis in the right knee;

Symptoms: difficulty in walking with strong pains and local and regional swelling even when resting;

5 Therapy: twelve 30 minute therapy cycles three times a week, the first 5 in diastole synchronization; the second 5 in systole synchronization and the last 2 in alternating systole/diastole synchronization;

Results: after the first 3 sessions, 30-40% improvement in the pain. After the sixth session, improvement in the local, regional swelling until complete disappearance, at the end of the treatment, of the clinical picture.

#### Marconi-therapy

##### Example 4

Sex: female;

Age: 53 years old;

15 Pathology: lumbago;

Symptoms: widespread algic symptomatology in the lumbo-sacral region, influencing the sciatic nerve and frequent articular blockages;

Therapy: twenty 30 minute sessions, four times a week, in diastole synchronization;

20 Results: after the first 7 sessions, 60-70% reduction in the articular blockages, and 50% improvement in the pain. At the end of the treatment complete disappearance of the symptomatology.

#### Radar therapy (microwaves)

##### Example 5

25 Sex: male;

Age: 40 years old

Pathology: right epicondylitis;

Symptoms: difficulty in moving with strong pains with a decrease in strength;

Therapy: fifteen 20 minute sessions twice a week in diastole synchronization;

Results: from the fourth session on gradual and continuous improvement in the pain and articular movement.

### **Infrared Laser**

#### Example 6

5 Sex: female;  
 Age: 48 years old;  
 Pathology: periarteritis in the humeral scapula;  
 Symptoms: difficulty in moving the shoulder, with incapacity to effect personal  
 10 care. Extremely strong pain with movement and upon local-regional pressure;  
 Therapy: twenty 15 minute sessions three times a week. The first 8 sessions in diastole synchronization; the second 8 in systole synchronization and the last 4 in alternating systole/diastole synchronization;  
 Results: after the first four sessions, 30-35% improvement in the pain and  
 15 movement. At the 10<sup>th</sup> session, a further 40% improvement; at the end of the treatment, disappearance of the pain and complete reactivation of the humeral scapula articulation.

### Ultraviolet

#### Example 7

20 Sex: male;  
 Age: 68 years old;  
 Pathology: widespread vitiligo;  
 Symptoms: ---  
 Therapy: thirty-five 15 minute sessions twice a week in diastole synchronization;  
 25 Results: discreet skin re-pigmentation of the area treated, 3-4 months after the completion of the treatment, the stabilization of the above situation was observed.

#### Example 8

For comparative purposes, radiotherapy was effected using pulsating emission at 1 Hz, with a

radiation of 2450 MHz, on a subject having a pathology similar to that of example 5.

Sex: male;

Age: 38 years old;

Pathology: difficulty in moving with strong pain and a decrease in strength;

5 Therapy: fifteen 20 minute sessions twice a week with a pulsating frequency of 1 Hz;

Results: Slight improvement in the pain and movement only at the 10<sup>th</sup> session.  
At the end of the cycle 70% attenuation of the pain.

Infrared lamps

10 Example 9

Species: adult horse;

Pathology: sprain of the front left knee;

Symptoms: limping, difficulty in moving;

Therapy: thirty 25 minute sessions daily in diastole synchronization;

15 Results: slight improvement after the first five sessions. At the 20<sup>th</sup> session  
7080% improvement. At the end of the cycle return to normality.

## CLAIMS

1. A device for the therapeutic and aesthetic treatment of human beings and animals effected by the emission of electric, magnetic energy and non-ionizing electromagnetic radiation, comprising an electric circuit suitable for making this emission synchronous with the heartbeat frequency of the person or animal subjected to treatment.  
5
2. The device according to claim 1, also comprising a timer.
3. The device according to any of the previous claims, characterized in that the electric circuit allows the energy source to be deactivated at the beginning of the systolic phase.
4. The device according to claim 1 or 2, characterized in that the electric circuit allows the energy source to be deactivated at the beginning of the diastolic phase.  
10
5. The device according to any of the previous claims, wherein the electric circuit makes the emission of energy synchronous with the heartbeat frequency in the case of treatment preferably selected from electro-stimulation, tens, magneto-therapy, Marconi-therapy, radar therapy, laser therapy for analgesic use, ultraviolet therapies and infrared therapies for animals.  
15
6. The device according to any of the previous claims, wherein the electric circuit makes the emission of energy synchronous with the heartbeat frequency in the case of Marconi-therapy with radiations produced by apparatuses of the facing plate type.
7. The device according to any of the previous claims, wherein the treatment is effected with radio frequencies at a frequency of 27.12 MHz.  
20
8. The device according to any of the claims from 1 to 5, wherein the electric circuit makes the emission synchronous with the heartbeat in the case of a radar therapy produced by an aerial.
9. The device according to the previous claim, wherein the treatment is effected with microwaves at a frequency of 2450 MHz.  
25
10. The device according to any of the claims from 1 to 5, wherein the electric circuit makes the emission synchronous with the heartbeat in the case of infrared treatment in which the infrared radiations are produced by diodes.
11. The device according to any of the claims from 1 to 5, wherein the electric circuit makes



the emission synchronous with the heartbeat in the case of laser treatment with the emission of infrared radiation.

12. The device according to any of the claims from 1 to 5, wherein the electric circuit makes the emission synchronous with the heartbeat in the case of ultraviolet treatment with radiations having a wave length ranging from 180 to 400 nm.

5

# INTERNATIONAL SEARCH REPORT

International Application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61N1/40 A61N2/02

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 769 778 A (SWARTZ CONRAD M ET AL) 23 June 1998 (1998-06-23) abstract	1,2,5
X	US 6 029 084 A (LONG SHARON ALICE JANE ET AL) 22 February 2000 (2000-02-22) abstract	1,2,5



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Information on patent family members

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