

(12) **United States Patent**
March

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(54) **METHOD OF TREATING
CARDIOVASCULAR DISEASE BY
ANGIOGENESIS**

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patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.**⁷ **A61B 17/52**

(52) **U.S. Cl.** **600/9**

(58) **Field of Search** 600/9-15

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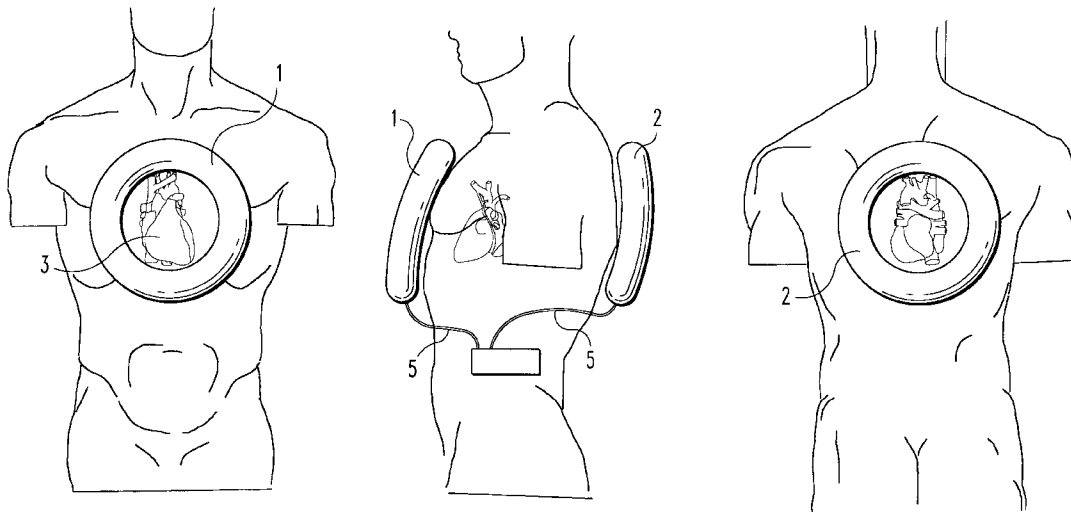
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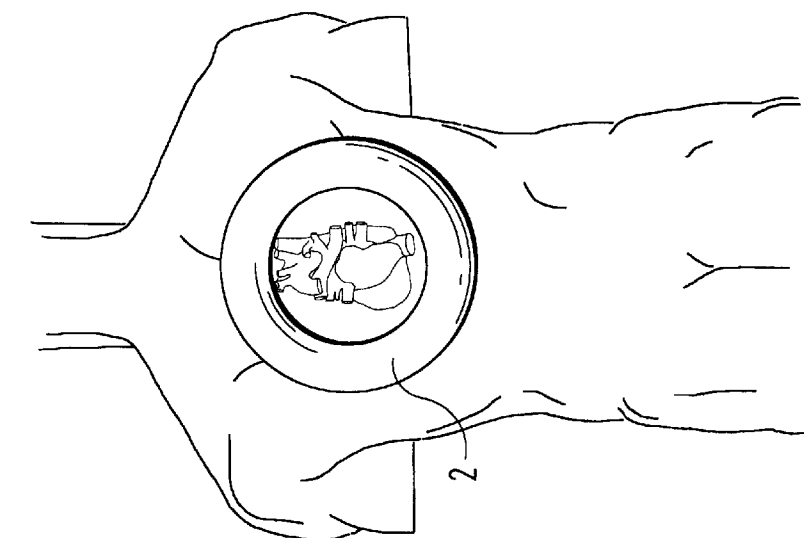
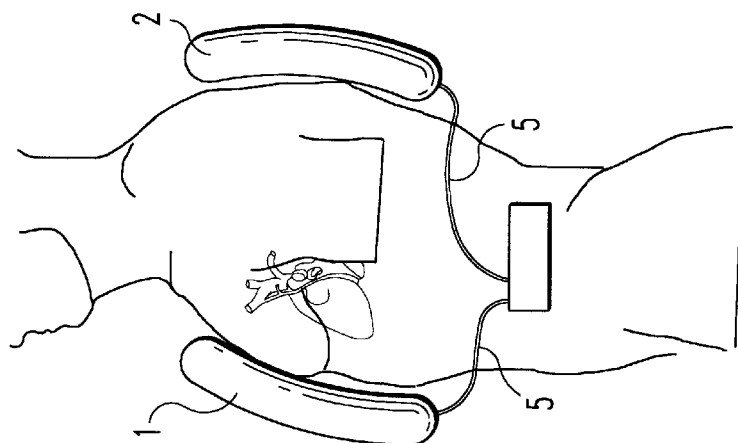
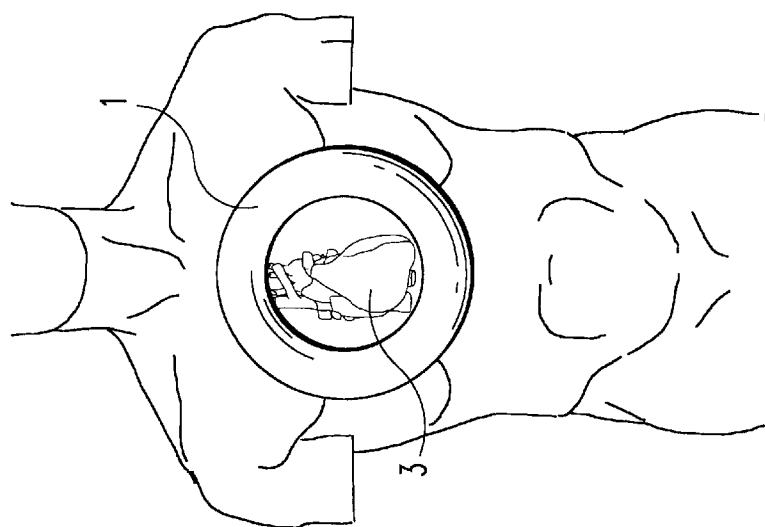
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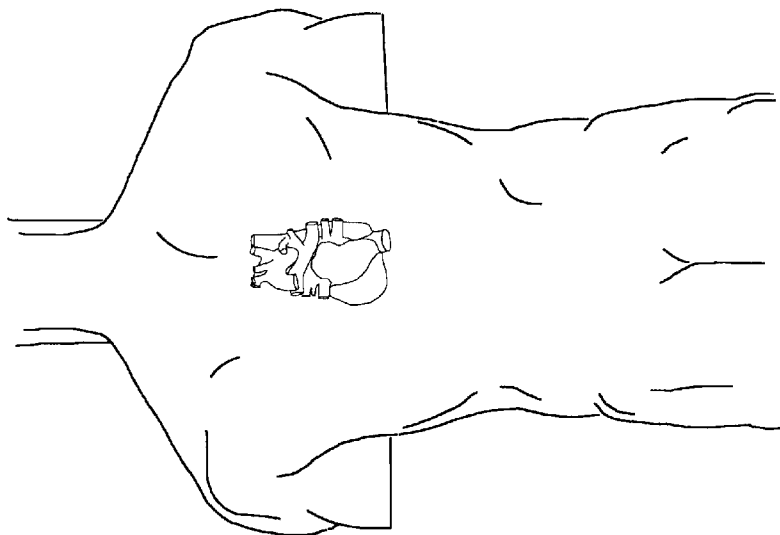
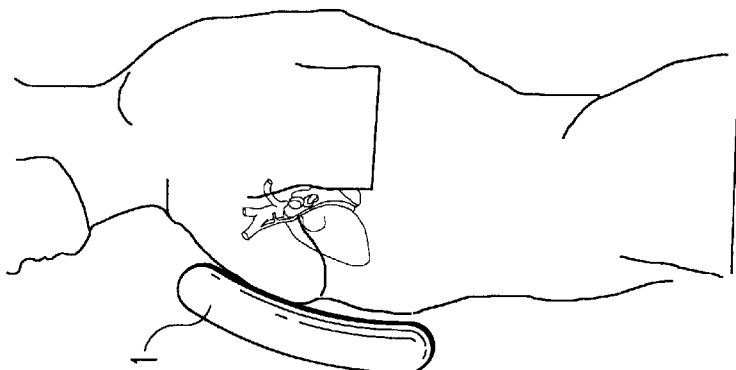
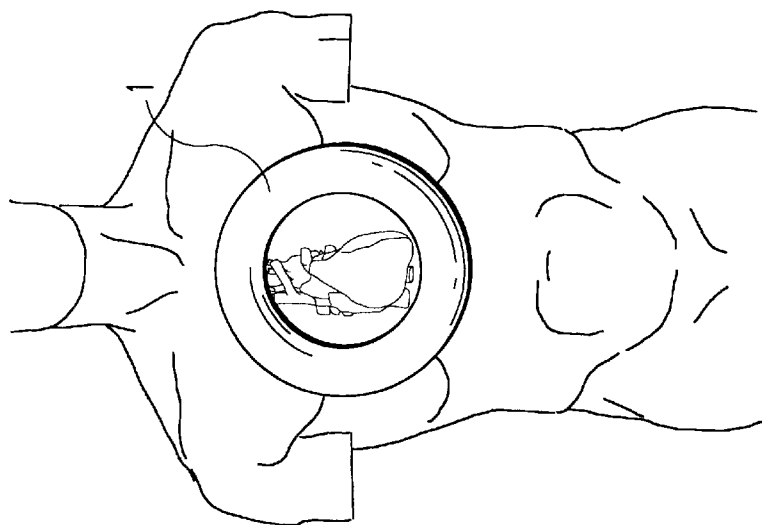
(57) **ABSTRACT**

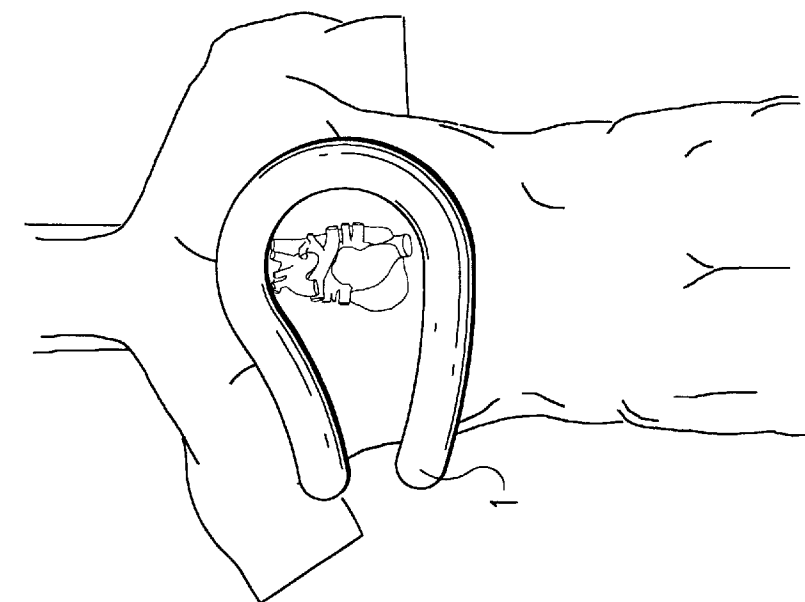
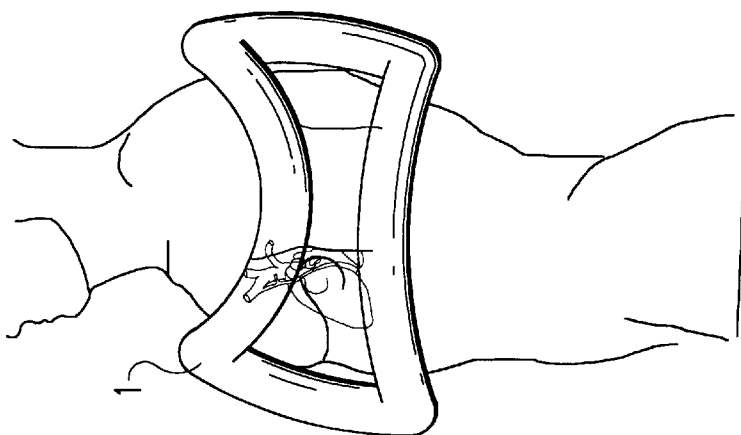
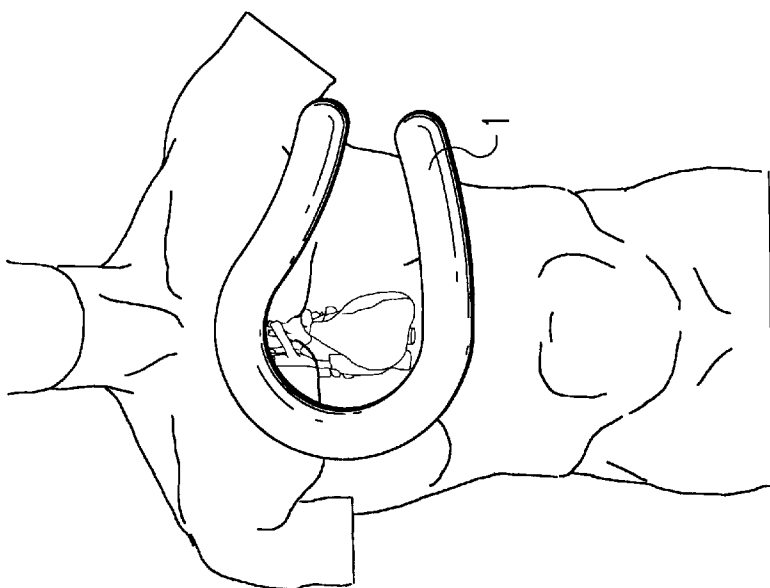
A system and method for treating cardiovascular disease
utilizes electromagnetic fields (EMF) applied by non-
invasive or minimally invasive procedures. The EMF is
applied to existing vascular structure to modulate blood flow
and blood vessel growth in the patient. In one embodiment,
a structure of electromagnetic coils is placed about a desired
treatment zone to apply an EMF to the zone on the order of
10⁻⁴-10 T. For cardiac angiogenesis, coils can be positioned
on the anterior chest wall and on the back at the level of the
heart. Various coil configurations are contemplated to yield
appropriate field intensities at the treatment zone. In another
embodiment, coils can be implanted within the patient and
placed within or overlying the treatment zone. An EMF
dosage plan can be developed for the patient and specific
treatment zone incorporating several aspects, such as fre-
quency components, the use of a carrier frequency, pulse
shape, duty cycle, and total time exposure to the EMF.

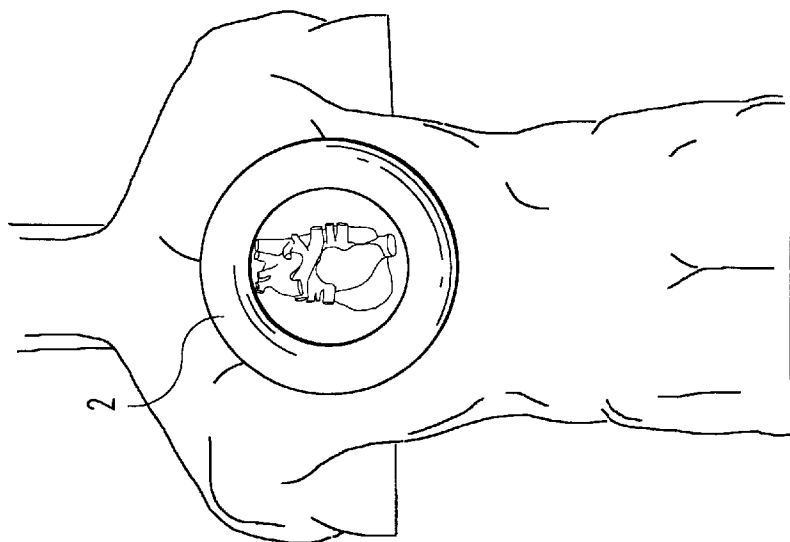
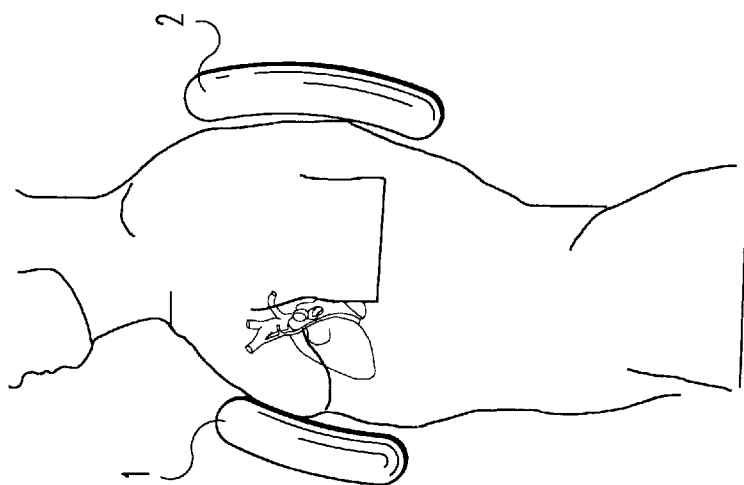
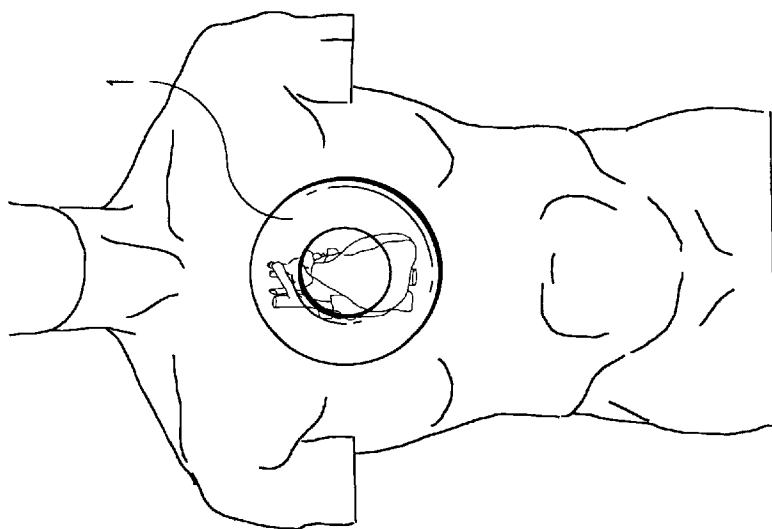
9 Claims, 7 Drawing Sheets



**Fig. 1C****Fig. 1B****Fig. 1A**

**Fig. 2C****Fig. 2B****Fig. 2A**

**Fig. 3A****Fig. 3B****Fig. 3C**

**Fig. 4C****Fig. 4B****Fig. 4A**

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